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ABSTRACT

This document, prepared for an ongoing assessment on adult literacy and new technologies, reports on a study that examined the scope and suitability of software for adult literacy programs, available sources of information concerning software use in adult literacy programs, and the implications for federal policy. First, a quantitative analysis of the distribution of the available supply of software for adult literacy with respect to subject, adult literacy submarket, type, price, computer brand, other hardware issues, and copyright date was performed. Next, detailed surveys and follow-up interviews were conducted with 33 adult literacy provider organizations throughout the United States for the purpose of assessing the suitability of the existing supply of software for different adult student populations. The needs of software acquisition decision makers, the type of information actually provided by different sources, and the accessibility of each source were examined in an overview of sources that provider organizations consult for information about software. The study findings were synthesized into six recommendations regarding the federal government's role with respect to technology for adult literacy. The following materials are appended: 19 figures and 18 tables detailing the scope of the current supply of adult literacy software; a list of participating adult literacy provider organizations; the provider organization survey and interview forms; and a list of highly recommended stand-alone software products. Contains 17 references. (MN)

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SOFTWARE FOR ADULT LITERACY: SCOPE, SUITABILITY, AVAILABLE SOURCES OF INFORMATION, AND IMPLICATIONS FOR FEDERAL POLICY

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Final Report

Adult Literacy and New Technologies: Tools for a Lifetime

June 1992

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
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SCOPE, SUITABILITY, AVAILABLE SOURCES OF INFORMATION,

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INTRODUCTION

This report presents an analysis of the scope of the current supply of software available for adult literacy and its suitability for a variety adult student populations. In addition, an overview of the information sources available to adult literacy software acquisition decisionmakers is provided. Finally, we discuss some options for federal policy on technology for adult literacy.

Throughout this report, the term *adult literacy* is defined broadly to include basic reading skills, the ability to function in one's environment (*functional literacy*), and the ability to adapt to the ever-changing demands of the workplace (*workplace literacy*)[1]. Specific adult student populations (or sub-markets) addressed include: Adult Basic Education (ABE), English as a Second Language/Limited English Proficiency (ESL/LEP), students preparing for the General Equivalency Development (GED) high school equivalency exam, students preparing for or at the workplace, and inmates in correctional facilities.

The report is divided into four chapters. In Chapter 1, we examine the distribution of the available supply of software for adult literacy with respect to subject, adult literacy sub-market, type, price, computer brand and other hardware issues, and copyright date. This quantitative analysis is based on a compilation of stand-alone software product data from several of the most up-to-date sources available. Also presented in Chapter 1 is a brief overview of Integrated Learning Systems (ILSs) and other important technology-based learning systems appropriate for adult learners.

In Chapter 2, we assess the suitability of the existing supply of software for different adult student populations. The concept *suitability*, as used here, encompasses both software quality and appropriateness. The primary source for this analysis is a detailed survey of and follow-up interviews with 33 adult literacy provider organizations throughout the country.

In Chapter 3, we present an overview of sources that provider organizations consult for information about software. This overview takes into consideration the needs of software acquisition decisionmakers, the kind of information actually provided by different sources, and the accessibility of each source. As in Chapter 2, this overview draws upon responses from 33 adult literacy provider organizations throughout the U.S.

Finally, in Chapter 4, we offer suggestions for a government role with respect to technology for adult literacy.

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[1] Lori A. Forlizzi, Adult Literacy in the United States (University Park, PA: Institute for the Study of Adult Literacy, The Pennsylvania State University, 1989.

CHAPTER 1

SCOPE OF THE CURRENT SUPPLY OF ADULT LITERACY SOFTWARE

OVERVIEW

This chapter presents a quantitative analysis of the scope of the current supply of adult literacy software. Our purpose here is to describe the supply. Interpretative analysis, for the most, occurs in Chapter 2, where the needs of adult literacy provider organizations are discussed.

The data upon which this analysis is based come from the following sources:

Apple Access: Adult Basic Skills Curriculum Software Guide (Apple Computer, Inc.)[2]

Apple Access: Macintosh Educational Software Guide (Apple Computer, Inc.)[3]

Apple Adult Basic Education Resource Guide (Apple Computer, Inc.)[4]

Oregon/Washington Adult Basic Skills Technology Consortium Software Buyers Guide (Oregon/Washington Adult Basic Skills Technology Consortium)[5]

TESOL CALL Interest Section Software List 1991 (Teachers of English to Speakers of Other Languages)[6]

Education TURNKEY's MS-DOS educational software database (unpublished)[7]

IESD's survey of adult literacy provider sites

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2 Marjorie DeWert and Beverly U. Student (eds.), Apple Adult Basic Education Resource Guide (Cupertino, CA: Apple Computer, Inc., 1991).

3 Jeffrey H. Orloff (ed.), Apple Access: Macintosh Educational Software Guide (Cupertino, CA: Apple Computer, Inc., 1991).

4 Tina Ruppelt (ed.), Apple Access: Adult Basic Skills Curriculum Software Guide (Cupertino, CA: Apple Computer, Inc., 1988).

5 Barbara A.W.Wright (ed.), Oregon/Washington Adult Basic Skills Technology Consortium Software Buyers Guide (Seattle, WA: Oregon/Washington Adult Basic Skills Technology Consortium, 1991).

6 Deborah Healey and Norman Johnson (eds.), TESOL CALL Interest Section Software List 1991 (Alexandria, VA: Teachers of English to Speakers of Other Languages, 1991).

7 Education TURNKEY Systems, Inc. (compiler), "IBM Education Systems Educational Software and Courseware," unpublished document, September, 1991.

A review by Interactive Educational Systems Design (IESD), Inc., of existing sources of data on adult literacy software indicates that these are the among the most up-to-date sources available covering large numbers of stand-alone products[8]. (Many local provider organizations throughout the country produce their own software lists, but these were not reviewed for this report.)

The term *stand-alone* means that the software can run on an individual microcomputer. Many of the products can also be used with networked computers or come in network versions, but all of them are available for non-networked, stand-alone computers.

Each data source has its own criteria for including software products. The Apple Computer publications include software judged by nationally recognized educational software review sources as high quality and judged by a committee of adult basic education technology experts as suitable for adults. The Oregon/Washington Adult Basic Skills Technology Consortium Software Buyers Guide includes software products in use at adult literacy provider sites throughout Oregon and Washington. The TESOL CALL Interest Section Software List 1991 lists software used by adult ESL/LEP provider sites throughout the U.S. Education TURNKEY's MS-DOS database includes products that, according to the software publisher, are suitable for adult basic education; this information source was included to prevent underrepresentation of MS-DOS products. Finally, IESD included software recommendations from 33 adult literacy provider organizations across the country. (See Chapter 2 for a detailed description of these organizations.)

After confirming that the software products identified by these sources were still available on the market, information on each product concerning subject, adult literacy sub-market appropriateness, software type, price, computer brand compatibility, hardware requirements, and copyright date was entered into a software database designed and developed specifically for this analysis[9].

In all 1,451 software products have been identified from this process that can be run on stand-alone microcomputers: 587 individual products (40.4%) and 864 products that are part of a series (59.6%). This adult literacy software database should be considered as a large sample of the total universe of software that can be used successfully in adult education, for the following reasons.

* In some instances, publishers have many products they market as suitable for adults, but only some were identified by our data sources.

* When considering general purpose productivity software of any given type (e.g., word processors), there are certainly more products available on the market than our data sources have identified.

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8 The focus of this quantitative analysis is computer-based microcomputer software. The scope of the analysis does not include non-computer, technology-based instruction (e.g., lessons delivered via videocassette).

9 The original design was reviewed by IESD consultants and advisors, and by OTA staff, and was then revised. The database was developed for IESD by LIST Services, Inc.

* Public domain and home-grown products are likely to be undercounted. Products that are custom-developed for the particular requirements of a local provider organization were not included in the database.

* Any published set of data sources is likely to underrepresent the most recent of products.

We estimate that, in fact, the total universe of software for adult literacy is at least 2,000 products. For most of the data presented below, the 1,451 product sample well-represents this total universe. Likely mismatches between sample and universe are noted below.

In addition to the stand-alone software universe, there are several larger, more expensive learning systems available on the market. These are considered separately, later on in this chapter.

DISTRIBUTION OF PRODUCTS BY SUBJECT

Not surprisingly, the largest percentage of software products falls within the major subject Language Arts (53.0%), followed by Mathematics (21.6%). All of the other major subject categories (Social Studies, Science, and General Purpose) account for less than 10% of the products. Of the Other subjects, only one included more than 5% of the software: Life Skills (8.4%).

Figure 1 (Appendix I, page I-1) presents the percentage of software programs by subject in graph form. Table 1 (Appendix I, page I-3) presents the raw data and percentages in a data table. Most subject categories in Figure 1 and Table 1 are self explanatory. Subjects in need of further clarification are as follows.

General Purpose: Open-ended software that is not subject-specific. For example, a word processor such as *Magic Slate II* (Sunburst Communications), a graphics program such as *Deluxe Paint II* (Electronic Arts), and desktop publishing software such as *Springboard Publisher II* (Scholastic) are all classified as General Purpose because they can be used across the curriculum.

Career Guidance: Software that helps students learn about different careers. Products that help students match their interests and talents to various fields of work. Examples include *That's My Job* (Hartley), *Job Trails* (Penn State University Institute for the Study of Adult Literacy), and *Exploring Careers Series* (Queue).

Computers & Keyboard: This is shorthand for Computer Basic Skills and Keyboarding. Computer Basic Skills include learning the basic tasks involved in using a computer (e.g., booting up, inserting disks, standard keys) and becoming aware of the various ways that people take advantage of computer-based technology; examples include *Applications for Your Computer & You* (South-Western) and *Computer Concepts* (Ventura Educational). Keyboarding refers to typing on a computer. (However, word processing programs are not assigned this

classification.) Examples of keyboarding products include *Mavis Beacon Teaches Typing!* (Software Toolworks) and *Typing Tutor IV* (Simon and Schuster).

Employment: This combines two related subjects: Pre-employment and Work Maturity Skills (e.g., good work habits and on-the-job etiquette); and Vocation-specific Skills (skill preparation for a specific line of work). Examples include *Letter Writer for Job Seekers* (Wintergreen) and *R.O.A.D. to Success* (Penn State University Institute for the Study of Adult Literacy).

Life Skills: The broad array of skills necessary for success at everyday living (e.g., coping with stress, balancing a checkbook, reading a bus schedule). Examples include *Life Skills Series* (Hartley), *Reading Realities: Real-Life Issues* (Teacher Support Software), and *You and Your Money* (Queue).

Problem Solving: Programs that address General Problem Solving skills with application across domains rather than problem solving skills that are subject-specific. Examples include *Fun with Problem Solving* (Focus Media), *Blueprint for Decision Making* (Broderbund), and *Reasoning and the Logical Process* (Lawrence Productions).

Distribution of Language Arts Products

Figure 2 (Appendix I, page I-2) and Table 2 (Appendix I, page I-3) represent the distribution of Language Arts products by curriculum area. There is a relatively even distribution of Grammar & Punctuation (30.5%), Spelling & Vocabulary (30.2%), Reading Comprehension (28.5%), and Basic Reading (26.9%) products[10]. The smallest percentage of programs is in Writing (14.0%), an area that may be underserved by the marketplace. Note that word processing products are categorized as both General Purpose and Writing. If the 80 word processing products are subtracted from the 107 products categorized as Writing, the remainder of 27 non-word processors is quite small for such an important area of the curriculum[11].

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[10] Examples of Grammar & Punctuation software include *Skills Bank II: Language Series* (Skills Bank) and *The Electronic English Handbook* (William K. Bradford). Examples of Spelling & Vocabulary products include *Spell It Plus* (Davidson) and *Vocabulary Mastery II for Business* (American Language Academy). Examples of Reading Comprehension software include *Reading for Meaning Series* (IBM) and *Gapper Reading Lab* (Queue). Examples of Basic Reading products include *CORE Reading and Vocabulary Development* (Educational Activities) and *MacLiteracy* (Hacienda La Puente Unified School District).

[11] This is not meant to encourage the development of software that addresses writing as a set of independent skills to be practiced in isolation. We envision products that work interactively with popular word processing software, while addressing aspects of the writing process.

Distribution of Mathematics Products

Figure 3 (Appendix I, page I-2) and Table 3 (Appendix I, page I-3) represent the distribution of Mathematics products by curriculum area. Over two-thirds of the programs are in the Math Basic Skills area (71.9%). The percentages for Math Applications (30.4%) and Math Advanced (9.9%) are dramatically lower[12].

DISTRIBUTION OF PRODUCTS BY SUB-MARKET

As expected, the largest percentage of products were judged to be suitable for the ABE sub-market (81.8%), followed by ESL/LEP (34.4%), and GED (19.3%)[13].

Within the ABE sub-market, there is a relatively even distribution among ABE Levels 1 through 3 [14]. However, Level 2 accounts for a larger adult student population than the other levels, and, therefore, the need for software is likely to be greater[15]. (Because of the larger student population, Level 2 is the ABE level where commercial software publishers are most likely to meet with financial success.)

Despite the near even distribution of software products among the three levels, students at ABE Level 1 are, nonetheless, at a disadvantage. Most early reading programs are geared explicitly to children and include features that may "turn off" many adults. Furthermore, the available software supply for ABE Level 1 is more appropriate for the higher functioning students within that level. ABE Level 1 is typically considered to include students functioning at traditional reading grade levels 0-3. The vast majority of ABE Level 1 software is not appropriate for students at reading grade levels 0 and 1, which includes non-readers and those with the most minimal of skills. Only 23 of all ABE Level 1 products (9.3%) take advantage of human speech, which lower-functioning Level 1 students require. And since only a small proportion of the adult student population falls within ABE Level 1[16], this is a sub-market much less likely to attract commercial software publishers. Government intervention may be especially important.

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12 Examples of Math Basic Skills software include *Mathematics 100* (BLS Tutorsystems) and *2nd Math* (Stone & Associates). Examples of Math Applications products include *Math Blaster Mystery* (Davidson) and *Math Shop* (Scholastic). Examples of Math Advanced software include *Escape from Algebra* (Milliken) and *The Geometric Supposer: Quadrilaterals* (Sunburst Communications).

13 Examples of software appropriate for ESL/LEP students include *Spanish-to-English Learning Focus (SELF)* (American Language Academy) and *ESL Picture Grammar* (Gessler). Examples of products developed for GED students include *GED 2000* (Steck-Vaughn) and *GED Preparation* (Aquarius). In addition, many products that are not ESL-specific or GED-specific have been judged as suitable for these student populations.

14 In fact, most software products that are used with ABE students span two or more levels in appropriateness. For example, a productivity program such as *Banner Mania* (Broderbund) is highly appropriate for ABE Level 1 students but can be used with higher level students as well. Some instructional products, such as *Consumers and the Law* (Educational Activities), are appropriate for Levels 2 and 3 but not Level 1.

15 Eunice N. Askov, Director, Institute for the Study of Adult Literacy, correspondence to the U.S. Congress Office of Technology Assessment, Apr. 17, 1992.

16 Eunice N. Askov, Director, Institute for the Study of Adult Literacy, correspondence to the U.S. Congress Office of Technology Assessment, Apr. 17, 1992.

The database compiled for this analysis may underestimate the percentage of products suitable for the Workplace sub-market (0.7%). Many of the data sources used for this report did not attempt to categorize products as suitable for this sub-market.

These data are represented in Figure 4 (Appendix I, page I-4) and Table 4 (Appendix I, page I-5).

Major Sub-Market Distribution by Major Subject

Figure 5 and Table 5 (pages I-6 and I-7) represent the major sub-market distribution by major subject, answering the question:

> Of all the products available for a given subject, what percentage has been judged appropriate for ABE, for GED, and for ESL/LEP student populations?

The distribution for most subjects is similar to that of the overall sub-market distribution. However, for Mathematics and Science, there are more GED-appropriate products than ESL/LEP-appropriate products. This may be explained by the fact that Mathematics and Science are important focuses of the GED preparation curriculum, and are less important in the adult ESL/LEP curriculum. Nonetheless, the options in Science software for ESL/LEP students (only 13 products) are severely restricted.

Subject Distribution by Major Sub-Market

Figure 6 and Table 6 (Appendix I, page I-8) represent the subject distribution for each of the major sub-markets, answering the question:

> Of all the products that have been judged appropriate for a given student population, what percentage is available for Language Arts, for Mathematics, for Social Studies, for Science, for General Purpose, and for the Other subjects?

The distribution for ABE and GED is similar to that of the overall subject distribution. However, for ESL/LEP, the percentage of Mathematics products is dramatically lower than for the overall subject distribution (6.3% compared to 21.6%). Again, this may be explained by the fact that Mathematics is not the primary focus of the adult ESL/LEP curriculum. However, for those provider organizations that have expanded the ESL/LEP curriculum to meet the needs of functional and workplace literacy, the current supply of Mathematics products is inadequate.

DISTRIBUTION BY SOFTWARE TYPE

The software products are categorized by type. The following Instructional types are included:

> Drill: The computer is used to administer drill or practice problems to help students memorize information or master new skills. The computer provides immediate feedback regarding student responses. It may also record and report performance. Examples include *Studymate* (Compu-Teach) and *Talk to Me* (Educational Activities)

Tutorial: The computer is used to implement most of the instructional process (as either a supplement to or a substitute for classroom instruction). A comprehensive tutorial system may contain provisions for all of the following: student placement, introduction of new material, drill, practice, performance monitoring, remediation, and reporting of progress. Examples include *Ultrakey* (Bytes of Learning) and *Remedial Education Program* (Computer Learning Works).

Simulation: The computer is used to model a real-life or imaginary situation in a dynamic fashion so that students can interact with it and thereby learn about it. Simulations usually embody situations that students could not experience otherwise because of financial, safety, time, or other constraints (e.g., experimenting with the factors impinging on a body of water undergoing pollution). Examples include *And If Re-elected* (Focus Media) and *Time Navigator* (Minnesota Educational Computing Corporation).

Game: The computer plays or provides computational support for a game in which one or more students participate. The learning of new concepts or skills is promoted. Examples include *Number Munchers* (Minnesota Educational Computing Corporation) and *Scrambled Countries Game* (Concordia University-AV).

Other: This category is used to characterize Instructional products that do not fit the above categories.

Many products fit more than one type category. For example, it is common to find products that combine drill and tutorial, tutorial and simulation, or drill and game.

In addition to Instructional types, the following Productivity type categories are included: Word Processor, Database, Spreadsheet, Telecommunications, Desktop Publishing, Authoring, and Other[17]. The Authoring category includes Productivity-only products (e.g., pure courseware authoring products) and products that are both Instructional and Productivity (e.g., instructional "shells")[18]. The Other category is used to characterize Productivity products that do not fit the remaining categories.

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[17] Examples of Word Processing software include *WordPerfect* (WordPerfect) and *Bank Street Writer III* (Scholastic). Examples of Database products include *Dbase IV* (Borland) and *Earthquest* (Earthquest), an educational product that includes a searchable database. Examples of spreadsheet programs include *Lotus 1-2-3* (Lotus Development Corp.) and *Edu Calc* (Houghton Mifflin). An example of a Telecommunications product is *ProComm* (Datastorm Tech.) Some products, such as *Microsoft Works* (Microsoft), combine many or all of these productivity capabilities. Desktop Publishing is broadly defined to include easy-to-use products such as *The New Print Shop* (Broderbund) and professional products such as *Aldus Pagemaker* (Aldus).

[18] Examples of Productivity-only Authoring products include *Authorware Professional* (Authorware) and *HyperCard* (Claris). Examples of Instructional products with Authoring capability include the *M-ss-ng L-nks Series* (Sunburst Communications) and *Flash and Match* (Individual Software).

Of the 1,373 products that are categorized according to software type, over three-quarters are Instructional only (77.0%). Of the remaining products, 14.0% are Productivity only, and 9.0% are categorized as both Instructional and Productivity.

These data are represented Figure 7 and Table 7 (Appendix I, page I-9).

Distribution of Instructional Products by Type

Figure 8 (Appendix I, page I-10) and Table 8 (Appendix I, page I-11) represent the distribution of Instructional products by type. The greatest percentages of Instructional products fall within the Drill (71.5%) and Tutorial (52.8%) categories. The percentages for the remaining Instructional categories (Simulation, Problem Solving, Game, and Other) are significantly lower; none of these categories accounts for more than 11% of the products.

Distribution of Productivity Products by Type

Figure 9 (Appendix I, page I-10) and Table 9 (Appendix I, page I-11) represent the distribution of Productivity products by type. The largest percentages of Productivity products fall within the Authoring (36.8%), Word Processor (25.4%), and Database (19.7%) categories.

The large percentage of Authoring products may be due to the fact that the Authoring category includes both Productivity-only products and products that are both Instructional and Productivity (i.e., Instructional products with an Authoring component).

Software Type Distribution by Subject

Figure 10 and Table 10 (pages I-12 and I-13) represent the software type distribution for each major subject. The type distributions for Language Arts and for the Other Subjects cluster are similar to the overall type distribution.

The type distributions for Mathematics, Social Studies, Science, and General Purpose however, vary somewhat from the overall type distribution. In Mathematics, the percentage of Productivity (1.3%) products is very small. In Social Studies, there are more Simulation (34.2%) products than Drill (30.6%) or Tutorial (27.0%) products; and over one fifth of the products are categorized as Game (22.5%). In Science, there are more Tutorial (39.7%) and Productivity (36.2%) products than Drill (32.8%) products. The distributions for Social Studies and Science are positive findings, since they reflect currently preferred instructional methods for these disciplines. As expected, in the General Purpose subject category, Productivity (91.2%) products predominate.

Software Type Distribution by Sub-Market

Figure 11 and Table 11 (Appendix I, page I-14) represent the software type distribution for each major sub-market. The type distributions for ABE and for ESL/LEP are similar to the overall type distribution. However, among the products judged suitable for GED, there are slightly more Problem Solving (20.6%) products than Productivity (18.8%) products.

DISTRIBUTION OF PRODUCTS BY PRICE

In order to examine the distribution of software by price ranges, the percentages of products costing Less than $50, $50-$100, $101-$250, $251-$1,000, and Greater than $1,000 were calculated for Apple[19], Macintosh, MS-DOS, and Other computer brands. These percentages are presented in Figure 12 and Table 12 (Appendix I, page I-15).

The distribution of products by price is similar for Apple, MS-DOS, and Other -- with only about a third of the products costing less than $50 (35.4% for Apple; 36.0% for MS-DOS; and 30.5% for Other). The price distribution for Macintosh-compatible products is different -- with almost half the products costing less than $50 (48.6%). This may be partially explained by the inclusion of HyperCard stacks, which can be inexpensive to develop. Macintosh-only distributors, such as the Intellimation Library for the Macintosh and the CALL-IS Macintosh Users Group make it easy for inexpensive Macintosh software to reach the marketplace. However, such software is often substandard, slow, or laden with technical problems because the Macintosh is memory-demanding.

In the price distribution for each computer brand, over three-fourths of the products cost $100 or less.

Figure 13 and Table 13 (Appendix I, page I-16) show the distribution of products by price for each of the major sub-markets: ABE, GED, and ESL/LEP. While the distribution patterns are similar, note that about 80% of the software judged appropriate for GED cost $50 or more.

DISTRIBUTION OF PRODUCTS BY COMPUTER BRAND AND OTHER HARDWARE ISSUES

The percentages of software by computer brand are presented in Figure 14 and Table 14 (Appendix I, page I-17).

The largest percentages of software are available for Apple II (81.5%), MS-DOS (66.1%), and Macintosh (29.1%). Only 11.0% of the products are available in Apple II GS-specific versions.

Distribution of Subjects by Computer Brand

Figure 15 (Appendix I, page I-18) and Table 15 (Appendix I, page I-19) represent the subject distribution for each computer brand.

The subject distributions for Apple II, Apple II GS, and MS-DOS are similar to the overall subject distribution -- with the largest percentages of products falling within Language Arts, the Other Subjects cluster, and Mathematics.

The subject distribution for Macintosh follows this pattern as well, but there is a higher percentage of General Purpose products in the Macintosh distribution than in the overall subject distribution (16.1% of Macintosh products are General Purpose whereas only 8.6% of all products are so categorized). In fact, there are almost as many General Purpose products as Mathematics products for the Macintosh.

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[19] Apple II and Apple II GS products were combined for this analysis.

Networkable vs. Non-Networkable Products

As represented in Figure 16 (Appendix I, page I-20), 38.6% of the products are networkable (i.e., run on a network as is or are available in a network version). The remainder are non-networkable (61.4%).

Products Requiring Additional RAM

Figure 17 and Table 16 (Appendix I, page I-21) show the percentage of products requiring additional RAM by computer brand. For Apple 128K RAM is considered standard, and for Macintosh 1MB RAM has been considered, until recently, the standard memory requirement.

For MS-DOS, the RAM standard depends on the age of the computer. Some adult literacy provider sites purchased MS-DOS computers when 256K RAM was standard whereas for newer computers, 512K RAM or higher is standard. (Many professional-level MS-DOS Productivity products require 640K RAM or higher.)

For older MS-DOS computers (with 256K RAM), 25.3% of the products will require a RAM upgrade. For MS-DOS computers equipped with 512K RAM, only 8.3% will require more memory. Only a very small percentage of Macintosh (2.2%) and Apple (1.1%) products require more than the standard RAM. (The 1MB RAM standard for the Macintosh is quickly being replaced by a 2MB standard, at least for most newly-released and upgraded Macintosh productivity software, such as the new version of HyperCard and most word processing packages.)

Products Requiring Additional Peripherals

Figure 18 and Table 17 (Appendix I, page I-22) represent the distribution of products requiring additional peripherals. Of the 1,451 products identified, 17.2% require one or more additional peripherals. Of these 250 products, the highest percentages require a Color Monitor (39.6%), a Hard Disk drive (27.2%), or a Speech Board or box (21.2%).

The database compiled for this analysis may underestimate the actual percentage of products suitable for adult literacy that require a Videodisc player (9.6%) or a CD-ROM drive (3.6%) because of the newness of such products and the expense of the additional hardware. Products may have been released after the data sources used for this report were published. And many of the provider sites surveyed have not yet purchased Videodisc players and CD-ROM drives, so they would not have used or recommended products requiring such hardware.

Emerging Technology Consultants, publisher of the annual *Videodisc Compendium*, estimates that at least 15 publishers now offer videodisc products that are appropriate for the adult literacy market. Some of these publishers distribute more than one suitable product[20].

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20 Rubyanna Pollak, Emerging Technology Consultants, personal communication, Mar. 27, 1992. IESD has identified videodisc-based products judged suitable for adult students published by ABC News InterActive, CEL Educational, Davidson, Ferranti, ISC, Optical Data, Scholastic, V_Graph, Videodiscovery, and Voyager Company.

We estimate that at least two dozen CD-ROM-based products have been developed specifically for adult learners. For example, companies such as Davidson, Proficiency, Interactive Knowledge, Intechnica, and HEC are developing adult-specific products for CD-ROM. In addition, there are many general purpose, CD-ROM reference and database products available on the market, some of which may be appropriate for adult education. (It is essential that the readability level of the text of these general purpose products matches the reading level of the adult student population. Unfortunately, readability data are not readily available.)

DISTRIBUTION OF PRODUCTS BY COPYRIGHT DATE

Figure 19 and Table 18 (Appendix I, page I-23) represent the distributions of Apple II, Macintosh, and MS-DOS products by copyright date. Copyright dates were available for 61.5% of Apple II products, for 68.5% of Macintosh products, and for 56.0% of MS-DOS products. It is likely that the data underestimates the percentage of older products (since copyright date information is less likely to be available for older products) and of the very newest products (because they were released after the publication of the software data sources used for this report).

The data suggest that very little new Apple II product development can be expected in the future, whereas MS-DOS product development is likely to increase. Adult literacy software development trends for the Macintosh are difficult to predict from the available data. Macintosh computer hardware has recently become more price-competitive, which could increase Macintosh's adult literacy market share and, thus, encourage software development. However, increased development will depend on the availability of funds for provider sites to purchase additional computers.

In actual numbers of products identified, more MS-DOS (148) and Macintosh (114) products were published in 1990 or later than Apple II products (40).

INTEGRATED LEARNING SYSTEMS (ILSs)

Integrated Learning Systems, or ILSs, are larger technology-based learning systems that further expand the available adult literacy software universe. More specifically, an ILS is a special application of computer networking that typically includes:

* Instructional software covering a significant portion of one or more subject area curricula for a range of grade levels or student populations (usually including reading/language arts and mathematics)

* A management system that provides a way of assigning a sequence of computer-based activities to students, keeps records of student performance, and enables educators to generate printed reports on individual or group performance

* A correlation between the computer-based activities and an accepted curriculum framework for the subject areas covered

* A stated or implied promise from the publisher that the instructional software will be updated and revised on an on-going basis, and that additional software will be provided for the system

We identified nine ILSs that market to adult education provider organizations:

Computer Curriculum Corporation (CCC)/Simon & Schuster, A Paramount Communications Company
Computer Networking Specialists, Inc. (CNS)
Ideal Learning
Jostens Learning Corporation
CTB/McMillan/McGraw-Hill Integrated Learning System (formerly Computer Systems Research (CSR))
New Century Education Corporation
The Roach Organization, Inc. (TRO)/PLATO Education Services
Wasatch Education Systems
WICAT Education Systems

Tables 19, 20, and 21 (pages 13-14) present an overview of ILS curriculum offerings, test correlations, and costs. These data are based on an analysis of ILS marketing materials and follow-up interviews with company representatives[21].

Table 19. -- Overview of ILS Curriculum
N=9

Subject	Number Offering	Percent Offering
Reading	9	100.0%
Language Arts/Writing	9	100.0%
Mathematics	9	100.0%
GED	8	88.9%
Science	7	77.8%
Life Skills	7	77.8%
Social Studies	6	66.7%
General Purpose	6	66.7%
Employment/Career Guidance	6	66.7%
Computer Basic Skills/Keyboarding	5	55.6%
ESL	4	44.4%
Study Skills	3	33.3%
Health	2	22.2%
Parenting Skills	2	22.2%

Of 9 ILSs, 7 (77.8%) offer all or almost all proprietary instructional software (although collaborations with third-party publishers is a growing trend). The remaining 2 (22.2%) provide a mix of mostly third-party and some proprietary software.

[21] Our intent here is not to present a detailed description of any particular ILS. Rather, it is to provide a context for adult literacy provider organizations' opinions about ILSs, which are presented in Chapter 2.

Table 20. -- Overview of ILS Test Correlation
N=9

Test	Number Offering	Percent Offering
TABE	**6**	**66.7%**
Via Computerized Prescription	3	33.3%
Via Print-based Test	1	11.1%
Via Print-based Grid	2	22.2%
CASAS	**5**	**55.6%**
Via Computerized Prescription	2	22.2%
Via Print-based Test	2	22.2%
Via Print-based Grid	1	11.1%

Table 21. -- Estimate of ILS Costs[22]
N=7

Service Provided	Cost Range: 15 Workstations	Median Cost
Start-up: Management system and instructional software, set-up, and initial training	$18,000-$65,000	$35,500
Annual support and software update	$1,500-$6,000	$3,600

OTHER LEARNING SYSTEMS

Besides ILSs, there are other large-scale technology-based learning systems that serve adult populations. Two that are well-known among adult educators are U.S. Basics's *Comprehensive Competencies Program* (CCP) and IBM's *The Principle of the Alphabet Literacy System* (PALS)[23].

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[22] Data for CCC and Jostens were unavailable.

[23] Our intent here is to provide a context for adult literacy provider organizations' opinions about these systems, which are presented in Chapter 2. Other learning systems, such as the *Job Skills Enhancement Program* (JSEP, a civilian version of a U.S. Army computer-based learning system), are not analyzed in this report.

Comprehensive Competencies Program (CCP)

The heart of CCP is an organized, comprehensive, competency-based curriculum for adult education that includes cross-referencing to a variety of computer-based and print-based instructional materials. It is not a traditional ILS because:

* Its management system depends on both print-based materials and the computer: print-based manuals for assignment of instructional material, printed-based student progress forms, scanning in or manual entry of some test data onto computer, and manual entry of on-going student performance data onto computer.

* Computer-based instruction is delivered on stand-alone computers rather than via a computer network.

* Students can, if they and their teachers desire, work on a particular competency with little or no computer-based instruction.

* The system was designed so that local provider organizations can reference in additional instructional materials -- both print-based and computer-based.

Software

While most of the CCP-provided software is from third-party publishers (and does not add to the available supply of software for adult literacy), a few adult-oriented products are developed by U. S. Basics's sister organization, the Remediation and Training Institute. Currently the system provides 337 software products for Apple II computers and 218 products for MS-DOS computers. Subjects covered by the system include:

Reading (Basic through High School)
Mathematics (Basic through High School)
Integrated Language Skills
High School Writing
English as a Second Language
Citizenship Competencies
High School Social Studies
High School Science
Employability
Consumer Economics
Life Skills
Government and Law
Health and Family
Community Resources

Test Correlation

TABE is CCP's norm-referenced test of choice. The composite TABE score is used as the basic guide to placement within the curriculum sequence. There is no formal cross-reference to CASAS, but some local provider organizations have developed their own. The ABE curriculum spans TABE levels 4 through 12.

Costs

The cost of CCP systems vary because the instructional materials are typically sold in pre-bundled subsets. Table 22 (below) presents cost estimates for a typical system.

Table 22. -- Estimate of CCP Costs

Service Provided	Cost Range: 15 Workstations
Adult Basic Education	$25,000-$30,000
ESL	$5,000-$10,000
Annual Upgrade in Instructional Materials (if desired)	$1,000

Few literacy provider organizations purchase annual upgrades in instructional materials.

The Principal of the Alphabet Literacy System (PALS)

PALS is targeted specifically to illiterate adults and adolescents. It combines interactive computer-based multimedia, use of the computer as a word processor (or use of a typewriter), and print-based materials.

PALS Curriculum

PALS initially utilizes a phonemically-consistent spelling system instead of standard English spelling, which has multiple spelling variations for the same sound (e.g., *to*, *two*, and *too*) and different sounds for the same spelling (e.g., compare *hear* and *bear*).

In the initial instructional phase, students learn the PALS spelling system -- the "alphabetic principle" -- through an animated cartoon fable with human voice and practice touch typing exercises. In the second phase students engage in computer and print-based writing exercises that relate to the cartoon fable. During phase three, students work on directed and independent writing assignments, prepare personal resumes, and practice completing job applications. Throughout the curriculum sequence, much of the learning takes place in pairs.

PALS as a Learning System

PALS is considered a learning system because it provides a complete, sequenced curriculum and includes a carefully planned set of management procedures that teachers are expected to follow.

Changes in PALS Technology and Costs

Until recently, PALS was only compatible with IBM's expensive InfoWindow (touch window) display system -- a system that in a typical adult learning environment was dedicated to delivery of PALS. Now, PALS is available for a standard IBM microcomputer network equipped with a speech adapter, a mouse, and a CD-ROM drive. This network can be used to deliver PALS as well as a wide a variety of MS-DOS, network-compatible software.

To get a sense of how costs have changed, consider comparable PALS configurations designed to accommodate 16 students at one time, at prices available to certified educational institutions. In January 1990, a PALS lab that included 4 InfoWindow display units with computer workstations, 8 additional stand-alone computer workstations, two typewriters, and PALS software and print materials would cost $47,804. As of May 1992, a PALS lab that includes a 386 network server, 12 networked PS/2 computer workstations (each equipped with a mouse), all necessary networking hardware, two typewriters, networking software, and PALS software and print materials costs $30,959. The cost of the PALS software and print materials -- when separated from the hardware and networking software costs -- is now $3,146.

CONSIDERING THE NEEDS OF ADULT LITERACY PROVIDER ORGANIZATIONS

A presentation of the scope of the adult literacy software universe does not, in and of itself, indicate how well the needs of provider organizations are being met. These needs are addressed in Chapter 2.

CHAPTER 2

THE SUITABILITY OF SOFTWARE FOR ADULT LITERACY: HOW WELL ARE PROVIDER ORGANIZATIONS' NEEDS BEING MET?

OVERVIEW

This chapter addresses the suitability of the available supply of software for adult literacy. As indicated earlier, software suitability takes into account both software quality and its appropriateness for a particular student population. Since the adult literacy community is highly dependent on software that was designed for populations other than adult literacy students, it makes little sense to separate the issues of appropriateness and quality.

In this chapter, we explore the following questions:

> What are the current circumstances of provider organizations regarding educational technology hardware and software?
>
> What are their wants and needs with respect to educational technology?
>
> How do the wants and needs of provider organizations compare to the available supply of software?

To answer these questions, survey questionnaires were completed and follow-up interviews were conducted with representatives of 33 technology-using adult literacy instruction provider organizations across the U.S. The results were then analyzed in light of the software supply data presented in Chapter 1.

A note of caution is in order concerning the survey and interview data, and the analysis based on them. The sample of adult literacy provider organizations is extremely small -- too small to yield data that is statistically reliable. Notwithstanding this limitation, significant efforts (described below) were made to ensure a representative sample of provider organizations using instructional technology. Therefore, we believe the data to be highly suggestive of an accurate technology "picture" for such organizations throughout the U.S., but the data are by no means definitive.

SELECTION OF PROVIDER ORGANIZATIONS

The criteria for selection of provider organizations for this report were as follows.

1. Provider organizations were selected for geographical diversity -- from the northern, southern, eastern, western, and central parts of the United States.

2. Provider organizations were selected for diversity in institutional setting, including:

* *Community-based* non-profit organizations
* Institutions that are part of the *public school system*
* Institutions that are departments of *community or public colleges*
* Institutions that are part of *correctional facilities*
* Institutions that are *sponsored by corporations*
* One organization that is part of the *community library* system.

3. We sought a mixture of experienced technology-using literacy providers and those that are relatively new to technology. IESD analysts and consultants have found that technology-experienced and technology-novice educators often engage in different instructional and management practices, have different criteria for software selection, and have different software wants and needs. It was important that we capture these differences in this study. Provider organizations were considered to be *technology experienced* if they had been using computer-based technology for instructional purposes for more than three years. Organizations were categorized as *technology novices* if they had three years or less experience using computers with students.

4. We sought organizations that served two or more of the following adult student populations:

ABE Level 1
ABE Level 2
ABE Level 3
ESL/LEP
GED
Students in a Workplace Preparation or Workplace Literacy Program
Inmates at Correction Facilities
Students in a Literacy Program for Families (Intergenerational)
At-risk Students Re-entering the Educational System after Dropping Out of School
Students in Volunteer, Tutor-based programs.

Organizations addressing the needs of multiple student populations were desirable because of the small sample size (33 organizations).

5. Participants had to agree in advance to complete a lengthy survey form (requiring at least 1.5 hours to complete) and a lengthy follow-up interview (typically running from 45 minutes to 1.5 hours).

Recommendations for participating provider organizations came from IESD consultants and advisors, from OTA and adult literacy technology experts they suggested, and from federal and state agencies throughout the U.S. In addition, some of the participating provider organizations contacted during the screening phase recommended other provider organizations for consideration. In all, 43 organizations were screened before the final 33 were selected.

DATA COLLECTION INSTRUMENTS

Three instruments were developed and used to collect provider organization data for this study:

* A *screening form*, used to collect data necessary for selection of provider organizations (see Appendix III)

* A *survey form*, used for questions that favored multiple choice or open-ended written responses (see Appendix IV)

* A *follow-up interview protocol*, used for questions that lent themselves to verbal responses and to follow-up on issues raised on the completed survey forms (see Appendix V)

The original drafts of these instruments were reviewed IESD consultants and advisors, and by OTA staff, and were then revised. After the first five uses of each instrument, further revisions were made where needed.

SITE DEMOGRAPHICS

The 33 provider organizations selected for this study are listed in Appendix II. They span 15 different states, including California, Florida, Idaho, Kentucky, Massachusetts, Michigan, Minnesota, Mississippi, New York, Oregon, Pennsylvania, South Carolina, Texas, Washington, and Wyoming. Urban, suburban, and rural organizations were included.

Distribution of Provider Organizations by Student Populations Served

Provider organizations were selected with the goal of covering the broadest range of adult student populations, as shown in Table 23 (page 21).

Table 23. -- Distribution of Provider Organizations by Student Populations Served
N=33

Student Population Served	Number of Organizations	Percen
ABE Level 1	25	75.8%
ABE Level 2	23	69.7%
ABE Level 3 (Pre-GED)	22	66.7%
GED	24	72.7%
ESL	23	69.7%
Workplace Preparation or Literacy	25	75.8%
Literacy for Inmates at Correctional Facilities	14	42.4%
Literacy for Families (Intergenerational)	19	57.6%
Literacy for At-risk Re-entry Students (After Dropping Out)	25	75.8%
Adults in Volunteer, Tutor-based Programs	24	72.7%

For most of these student populations, computer-based technology was used as part of the instructional program in all or the vast majority of the adult literacy provider institutions. However, over 20% of the organizations did not use technology with ESL students; reasons were not provided, but they are likely to include: the small supply of ESL-specific software; lack of experience or training in the effective use of non-ESL-specific software; and (for some organizations) lack of funds for additional software. Over 35% did not use technology with their prison inmate student populations; reasons include: prison facilities that are not set up for using technology; and concern over security for hardware.

Over 30% did not use computers with adults in family literacy programs; reasons include: lack of teacher training in the use of technology to address family literacy; and lack of computers in the homes of students (i.e., it would be difficult for them to apply what they learn). One general reason often given for not using computers with these populations was the lack of sufficient numbers of computers. In some instances, these populations were served at satellite locations without computer facilities.

Distribution of Provider Organizations by Experience Level

The distribution of provider organizations by level of experience with instructional technology is presented in Table 24 (page 22).

Table 24. -- Distribution of Provider Organizations by Level of Experience with Technology
N=33

Level of Experience	Number of Organizations	Percent
Experienced: More than 3 years	21	63.6%
Novice: 3 years or less	12	36.4%

In our search for provider organizations, we found very few that had fewer than 15 months experience with instructional technology. (One possible explanation for this is that funding for computer hardware may have become less available as of the middle of 1990.) Distinctions between experienced and novice organizations are noted throughout this report.

Access to Computers and Funding for Technology: Technology-rich and Technology-poor Provider Organizations

To understand the context of provider organizations' technology wants and needs, it is important to take into account the access a given organization has to computer hardware and the funds it has available for future hardware and software purchases. To analyze differences between technology-rich and technology-poor provider organizations, we selected the benchmark of 15 computers -- a sufficient number for every student in a small class to have his or her own workstation, or to accommodate pairs of students in larger classes. (The median number of computers for the 33 organizations is actually 17.) Tables 25-29 (below through page 24) summarize the available data on computer access and technology funding.

Table 25. -- Distribution of Provider Organizations: Current Access to Computer Hardware
N=33

Level of Access	Number of Organizations	Percent
Technology-rich: 15 or more computers	17	51.5%
Technology-poor: Less than 15 computers	16	48.6%

Over 60% of the experienced organizations (13 of 21) are technology-rich. Two thirds of the novice organizations (8 of 12) are technology-poor.

Table 26. -- Computers Available to Technology-rich and Technology-poor Provider Organizations

Level of Access	Range: Computers Available	Median
Technology-rich: 15 or more computers (N=17)	17-300	35
Technology-poor: Less than 15 computers (N=16)	3-14	9

Table 27. -- Estimated Instructional Staff Size for Technology-rich and Technology-poor Provider Organizations[24]

Level of Access	Range: Est. No. of Instructors	Median
Technology-rich: 15 or more computers (N=17)	1.5-140.0	20.0
Technology-poor: Less than 15 computers (N=16)	1.0-27.5	6.0

[24] Estimates of instructional staff size include full-time and part-time instructors, but not aides, support personal, and volunteers. Part-time instructors vary in the number of hours they work. For purposes of comparison, each part-time instructor is counted as working half time, which results in an overestimation of staff size for some provider organizations.

Table 28. -- Computers Per Instructor for Technology-rich and Technology-poor Provider Organizations[25]

Level of Access	Range: Computers Per Instructor	Median
Technology-rich: 15 or more computers (N=17)	0.5-31.3	2.6
Technology-poor: Less than 15 computers (N=16)	0.3-6.0	1.0

Table 29. -- Estimated Annual Technology Budget for Technology-rich and Technology-poor Provider Organizations

Level of Access	Range: Estimated Annual Budget	Median
Technology-rich: 15 or more computers (N=17)	$0-$500,000	$32,500
Technology-poor: Less than 15 computers (N=16)	$0-$14,000	$500

Table 26 demonstrates the overall disparity in access to technology hardware between provider organizations that are *technology-rich* (15 or more computers) and ones that are *technology-poor* (less than 15 computers). What might explain this disparity?

Differences in the size of student populations served is one likely explanation. Table 27 presents an estimate of instructional staff size as an indicator of student population size. (The student population data necessary for meaningful comparisons about technology access were unavailable. It is assumed that, in general, the larger the instructional staff, the larger the student population.) The data presented in Table 27 suggest that technology-rich organizations do, in fact, typically serve larger populations.

But is the distribution of computer hardware equitable? The statistics in Table 28 (computers per instructor) provide a means of controlling for student population size. They suggest that student access to computers is weighted in favor of the larger provider

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[25] These data may underestimate the number of computers available per instructor for some provider organizations because they are based, in part, on estimates of instructional staff size. See footnote 6.

organizations. Instructors working for technology-rich, larger provider organizations (and likely their students as well) have greater access to computers and more flexibility in how to arrange them, due to economies of scale.

It must be stressed, however, that technology-rich provider organizations are richer only in comparison to technology-poor organizations. The data indicate that the supply of computer hardware available to most provider organizations, large or small, is inadequate if students are to use educational technology on a frequent, regular basis.

The budget estimates presented in Table 29 suggest that technology-rich provider organizations will have the opportunity to increase their computer hardware supply over time. However, there is little chance for improvement for most smaller, technology-poor organizations -- unless they receive additional financial support.

Why Distinctions between Technology-rich and Technology-poor Provider Organizations Matter

Distinctions between technology-poor and technology-rich organizations are important because:

* They predict differences in frequency of use and, therefore, in levels of computer expertise over time (for both teachers and students)[26].
* They predict which organizations are likely to take advantage of the latest software and emerging technologies (e.g., interactive videodisc, CD-ROM, multimedia).
* They predict differences in instructional management options. Having many computers in a classroom or frequent access to a computer lab allows teachers and students to restructure the learning environment; the technology encourages individualized and small group learning. Having infrequent access means that technology can, at best, be an occasional, positive "add-on" to the existing learning environment.

Consideration of provider organizations' level of access to technology can be an even more powerful analysis "lens" when combined with consideration of level of instructional technology experience. Where appropriate throughout the remainder of this report, distinctions will be made among the wants and needs of:

* Experienced, technology-rich provider organizations
* Novice, technology-rich provider organizations
* Experienced, technology-poor provider organizations
* Novice, technology-poor provider organizations

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[26] A note of caution is required here. Access to technology does not always mean that a provider organization will take advantage of that access. One provider organization contacted during this study had more than 15 computers on hand, but none were being used with students due to lack of a technology-experienced staff member or the funds to hire one.

Institution Types: Technology-rich and Technology-poor

Table 30 (below) presents a comparison of the different types of provider organization institutions, answering the question:

> Are there any patterns regarding "technology-richness" and "technology-poorness" for different institution types?

Table 30. -- Institution Types: Technology-rich and Technology-poor

Institution Type	Technology-rich		Technology-poor	
	No. of Orgs	Percent of N	No. of Orgs	Percent of N
Community-based Non-profit organizations (N=9)	2	22.2%	7	77.8%
Part of the Public School System (N=10)	8	80.0%	2	20.0%
Departments of Community or Public Colleges (N=9)	4	44.4%	5	55.6%
Part of the Library System[27] (N=1)			1	100.0%
Part of Correctional Facilities (N=2)	2	100.0%		
Sponsored by Corporation (N=2)			2	100.0%

Assuming that the patterns found here are representative of adult literacy provider organizations throughout the country, community-based non-profit organizations are more likely to be technology-poor than technology-rich. The reverse is likely true for provider organizations that are part of a public school system. The status of each college-based organization is highly dependent on the fiscal condition and commitment to technology-based learning of its particular state or local community.

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[27] The library's adult literacy classes use the computer facilities of a local college. This may not be typical of library-based provider organizations.

The Importance of Instructional Technology Grants

Over half of the adult literacy provider organizations (18 of 33) indicated that they depend on grants or government programs to fund the purchase of computer hardware. The most often-reported source of funding is government grants or programs (federal, state, and local). About one fourth of the organizations have received hardware grants or donations from private sources.

One respondent complained that grants that pay for computer hardware are available less and less. If this is true, technology-poor provider organizations will be especially hard hit, since many of them are not sufficiently budgeted for additional hardware purchases. Approximately 30% of these organizations (5 of 16) report having no budget (zero dollars) for technology currently.

TECHNOLOGY HARDWARE

In this section, we examine the current circumstances of the provider organizations regarding educational technology hardware.

Computer Brands

Table 31 (below) summarizes the provider organizations' use of different brands of computer.

Table 31. -- Use of Different Computer Brands by Adult Literacy Provider Organizations N=33

Computer Brand Used	Number of Organizations	Percent
IBM	27	81.8%
Apple II	25	75.8%
Non-IBM MS-DOS	16	48.4%
Macintosh	13	39.4%

Non-IBM MS-DOS computers are typically part of a hardware mix that includes IBM brand computers.

Approximately half of the experienced organizations use Macintoshes (11 of 21) compared to only one sixth of the novice organizations (2 of 12). The experienced, technology-rich organizations reported the highest proportion of Macintosh usage (8 of 13).

RAM Requirements

The vast majority of organizations using Apple II, IBM and MS-DOS, and Macintosh computers report having at least the standard RAM required to run most current software programs. Three-fourths of the Macintosh-using organizations have 2MB systems, sufficient memory to run even the latest, memory-demanding productivity software. However, many organizations with IBM computers will have to upgrade the RAM to take advantage of more powerful, RAM-intensive software, since only about 30% have at least one computer with 1 megabyte or more of RAM (8 of 27).

Access to Peripherals

Most organizations have access to what have become standard computer peripherals. The vast majority of organizations use color monitors, 5.25" and 3.5" disk drives, dual disk drives, and hard drives with at least some of their instructional computers. About 70% of the organizations use a mouse with at least some computers (23 of 33).

Access to Newer Technologies

Noticeably few organizations use the newer computer-related technologies, as shown in Table 32 (below).

Table 32. -- Access to Newer Computer-related Technologies by Adult Literacy Provider Organizations N=33

Technology Used	Number of Organizations	Percent
Speech Board or Box	13	49.3%
Scanner	11	33.3%
Videodisc Player	10	30.3%
CD-ROM	9	27.2%
Modem	8	24.2%
Touch Screen	6	18.2%

When asked about their purchasing plans for the next year, more organizations (5) mentioned CD-ROM than any other peripheral. Each of these organizations indicated that they would be first-time purchasers of CD-ROM technology.

Of the 13 provider organizations using a speech board or box, over 75% are technology-experienced.

Technology-rich provider organizations have a clear advantage in access to the newer technologies, as demonstrated in Table 33 (below).

Table 33. -- Access to Newer Technologies: Technology-rich and Technology-poor

Technology Used	Technology-rich		Technology-poor	
	No. of Orgs	Percent of N	No. of Orgs	Percent of N
Speech Board or Box (N=13)	9	69.2%	4	30.8%
Scanner (N=11)	9	81.8%	2	18.2%
Videodisc Player (N=10)	9	90.0%	1	10.0%
CD-ROM (N=9)	9	100.0%	0	0.0%
Modem (N=9)	6	66.7%	3	33.3%
Touch Screen (N=6)	5	83.3%	1	16.7%

Over half of the experienced, technology-rich organizations use speech boards or boxes, scanners, videodisc players, and/or CD-ROM.

Each of the 9 adult literacy provider organizations with access to a modem is currently using online telecommunications services, including OTAN, Argus, and America Online. However only 3 are having students engage in telecommunications activities. Educators from these organizations stress the advantages of providing a real purpose and a real audience for students' written communication. (This corresponds to recent research on educational telecommunicating.) These educators, as well as those from the organizations who do not expose students to telecommunications, point out the difficulty of integrating online usage into the curriculum. There is a need for the development of structured educational activities that will help maintain student interest beyond the initial curiosity about communicating over telephone lines via the written word. (Several activity-based online systems are available for the elementary grades through high school. These could supply models upon which adult-specific activities could be based.) Several provider organizations are finding that an online service provides valuable support for staff development.

Cost is often a consideration when deciding to use telecommunications. In most commercial systems, charges are based on the time spent. Some of these services have additional fees for special areas of service. It would be difficult for provider organizations to control costs, especially if students are given open access.

The Literacy Telecommunications Collaborative (LTC) in Boston provides an excellent model for citywide telecommunicating among adult literacy provider organizations. LTC currently includes five member organizations, three of which

participated in the survey and interviews for this report. The system provides electronic *bulletin boards*, on which students and educators write as a means of discussing issues of interest to students. It also includes a *chat* capability for real-time, one-to-one communication, and electronic mail. Since it is a non-profit, local online system, costs are relatively low. Only some of the member organizations are allowing students access to the service. All five adult literacy centers are using the network as a means of inter-agency communication. They are seeking to attract additional member organizations.

A few provider organizations reported that they use telecommunications as a means of disseminating an ILS to local provider sites. They complained that problems with telephone lines sometimes cause technical difficulties with the ILS.

Local Area Networks

Ten respondents indicated that network version availability is something they always consider when deciding whether to purchase software for instructional purposes. Of these 10, 6 are from provider organizations that have not purchased an ILS. No other information was provided on their use of the network.

Non-computer-based Technology

When adult literacy provider organizations discuss educational technology, they do not refer only to computers and related technologies. Use of other technologies is summarized in Table 34 (below).

Table 34. -- Use of Non-computer-based Technologies by Adult Literacy Provider Organizations N=33

Non-computer-based Technology Used	Number of Organizations	Percent
VCR	26	78.8%
Audiocassette recorder	20	60.6%
Television (broadcast, cable, or satellite)	14	42.4%

The most frequently-mentioned use of VCRs, audiocassette recorders, and television is viewing or listening to professionally-prepared instructional lessons.

Other videocassette and television program types include: theatrical movies; news and current events; documentaries; popular television programs (with or without sound, for instructional or motivational purposes); career preparation videos; student-made videos; and staff development. A primary purpose of having students watch videocassette and television programs is to stimulate class discussion.

Other uses of audiocassette recorders include: ESL speaking and listening practice (including listening to songs that teach vocabulary and sentence structure); recording and

listening to books, stories, and poetry (written by professional and student authors); recording oral histories; recording, transcribing, and reading classroom discussions; developing language experience stories (i.e., student-dictated stories) with low level students; spelling practice; and staff development.

A few organizations are using camcorders so that teachers and students can develop their own videos. One respondent experienced in using technology with inmate populations noted that video and interactive videodisc may be a more appropriate technologies than computers for such populations. He did not offer an explanation, but likely reasons include the following.

* Video, being primarily an audiovisual medium, is well-suited to the non-readers and low level readers frequently found in prison.

* Video is familiar, which creates a level of comfort.

* The "interface" for viewing a video is extremely easy: one sits and watches. No new procedural skills are required. Well-designed interactive videodiscs are also easy to use.

* Video watching is private, in the sense that whatever learning takes place occurs inside the student's head; performance before ones peers is not involved.

* Many interactive videos are designed for individualized, private learning (which many inmates prefer).

* Videodisc-based simulations can "transport" the student to other places and situations without him or her ever leaving the correctional facility.

* When educators enable students to make their own videos, they engage in a form of self-expression that prison life does not otherwise invite. For many inmates, writing is not an option as a form of self-expression, due to poor writing skills.

The respondent feels that computer-based instruction would have to be highly individualized and simulation-based to compete with video.

SOFTWARE FOR ADULT LITERACY

This section examines the software currently being used by the adult education provider organizations surveyed for this report. It also explores what the organizations want and seek in software. Throughout this section, we have included paraphrases or actual quotes from representatives of provider organizations regarding their software needs.

Software Used for Administrative Purposes

All 33 organization report using computers for administrative purposes. Little information was provided concerning administrative applications. (Administrative software is not the focus of this report.) However, a few provider organizations indicated they use General Purpose productivity software (i.e., database, spreadsheet, telecommunications, and desktop publishing products) for administrative purposes such as student recordkeeping, scheduling, cost accounting, and communicating with outside agencies and marketing to potential adult literacy students.

Subject Areas: What Provider Organizations Use and What They Seek

Subject Software Most Often Used

More provider organizations use Computer Basic Skills and Keyboarding (defined on page 4), Language Arts, and Mathematics software than software for any other subject areas. Specific subjects most frequently mentioned by provider organizations are summarized in Table 35 (below).

Table 35. -- Software in Use: Subjects Most Frequently Mentioned by Adult Literacy Provider Organizations N=33

Subject	Number of Organizations	Percent
Computer Basic Skills and Keyboarding	28	84.9%
Spelling and Vocabulary	27	81.8%
Writing	26	78.8%
Reading Comprehension	26	78.8%
Math Basic Skills	26	78.8%
Basic Reading Skills	25	75.8%
Grammar and Punctuation	25	75.8%
Math: Applications	24	72.7%
Math: Advanced Topics	22	66.7%

Keyboarding software products are extremely popular among adult literacy provider organizations and were frequently named on respondents' "most highly recommended" software lists. They probably account for the high frequency of the Computer Basic Skills and Keyboarding subject category. General Purpose productivity software is used infrequently as a vehicle for Computer Basic Skills and Keyboarding instruction. Only 6 organizations use Word Processing packages, only 3 use Spreadsheets, and only 2 use Database products to support such instruction.

About half of the organizations use software designed for Social Science (17 of 33), Science (16 of 33), Life Skills (16 of 33), and General Problem Solving (16 of 33).

In general, a greater percentage of the experienced, technology-rich organizations use software for each subject area than the other organizations.

To get a better picture of the software in use by the provider organizations, we asked them to identify products they use and would recommend to other organizations. (The assumption was made that they would not recommend software that just sits on the shelf "collecting dust.") The subject distribution for technology-novice and technology-experienced organizations is presented in Figure 20 and Table 36 (page 33).

Figure 20 — Distribution of All Recommended Products by Subject for Novice and Experienced Organizations *

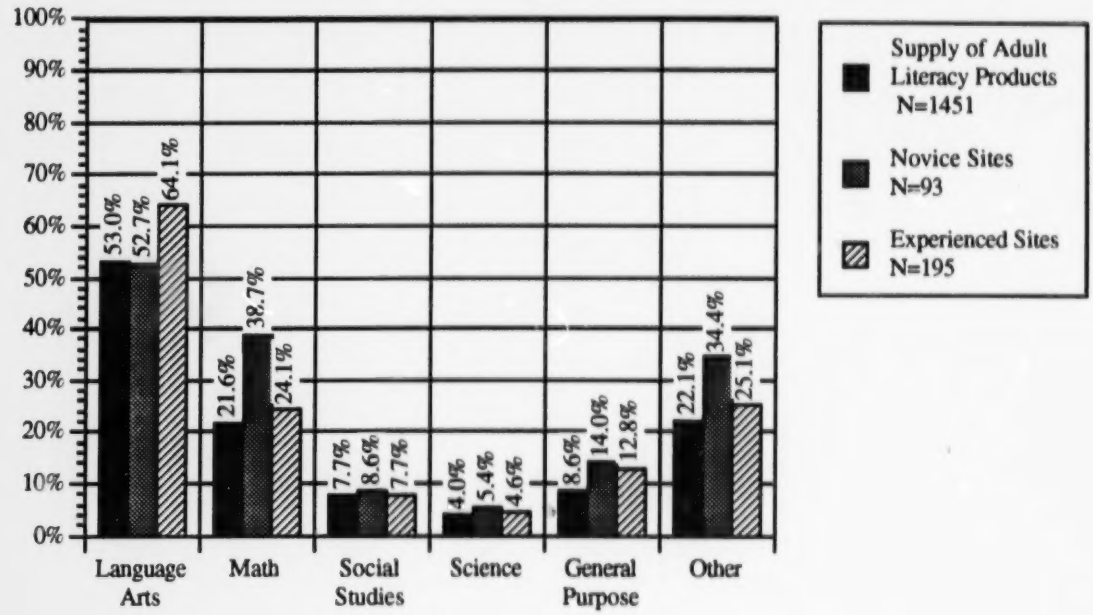

Table 36 — Distribution of All Recommended Products by Subject for Novice and Experienced Organizations *

Major Subjects	Supply of Adult Literacy Products N=1451		Novice Sites N=93		Experienced Sites N=195	
	No.	Percent	No.	Percent	No.	Percent
Language Arts	769	53.0%	49	52.7%	125	64.1%
Math	313	21.6%	36	38.7%	47	24.1%
Social Studies	111	7.7%	8	8.6%	15	7.7%
Science	58	4.0%	5	5.4%	9	4.6%
General Purpose	125	8.6%	13	14.0%	25	12.8%
Other	320	22.1%	32	34.4%	49	25.1%

* The sum of all percentages is greater than 100% because some products address more than one subject.

In general, the subject distribution of products in use is similar for technology-novice and technology-experienced organizations, and reflects the subject distribution of the available supply of adult literacy software. For technology-novice organizations, Mathematics products represent a higher percentage of all products in use, compared to Mathematics products as a percentage of all products in the adult literacy marketplace. For technology-experienced organizations, Language Arts products represent a slightly higher

percentage of all products in use, compared to Language Arts as a percentage of all products in the marketplace.

Subject Software Highly Recommended

We asked each provider organization to identify the five software products they would most highly recommend to other organizations. (See Appendix VI for a listing of the highly recommended products.) The subject distribution for technology-novice and technology-experienced organizations is presented in Figure 21 and Table 37 (below).

Figure 21 — Distribution of Highly Recommended Products by Subject for Novice and Experienced Sites *

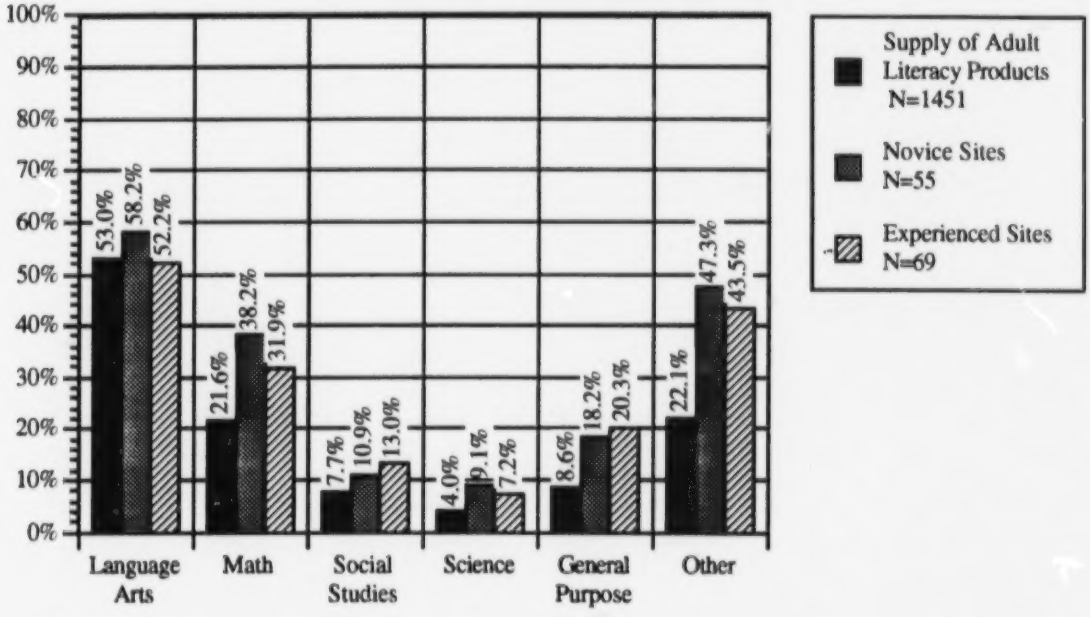

Table 37 — Distribution of Highly Recommended Products by Subject for Novice and Experienced Sites *

Major Subjects	Supply of Adult Literacy Products N=1451		Novice Sites N=55		Experienced Sites N=69	
	No.	Percent	No.	Percent	No.	Percent
Language Arts	769	53.0%	32	58.2%	36	52.2%
Math	313	21.6%	21	38.2%	22	31.9%
Social Studies	111	7.7%	6	10.9%	9	13.0%
Science	58	4.0%	5	9.1%	5	7.2%
General Purpose	125	8.6%	10	18.2%	14	20.3%
Other	320	22.1%	26	47.3%	30	43.5%

* The sum of all percentages is greater than 100% because some products address more than one subject.

While in general, the subject distribution of highly recommended products for technology-novice and for technology-experienced organizations reflects the subject distribution of the available supply of adult literacy software, there are some differences. For both technology-novice organizations and technology-experienced organizations, General Purpose and Mathematics products and products in the cluster of subjects called Other represent a higher percentage of all highly recommended products, compared to General Purpose, Mathematics, and Other as percentages of all products in the adult literacy marketplace. Word processing products are classified within the General Purpose category. The Other category includes: Computer Basic Skills and Keyboarding; software for workplace preparation and workplace literacy; Life Skills; Problem Solving; ESL-specific; GED-specific; and Health.

The distributions of highly recommended products (for both technology-novice and technology-experienced) more closely reflect the "standard" adult literacy curriculum than does the distribution of all available adult literacy products. It suggests a possible demand for General Purpose products, Mathematics products, and products in the subjects comprising the Other cluster.

Subject Software Most Often Sought

There is little consensus among adult literacy provider organizations when it comes to plans for future software purchases. The most often-mentioned subject areas are presented in Table 38 (below).

Table 38. -- Software Sought for Purchase: Subjects Most Frequently Mentioned by Adult Literacy Provider Organizations N=33

Subject	Number of Organizations	Percent
General Problem Solving	14	38.9%
Pre-employment and Work Maturity Skills	14	38.9%
Math: Applications	12	36.4%
Math: Advanced Topics	12	36.4%
Parenting Skills	12	36.4%
Social Science	11	33.3%
Life Skills	11	33.3%
Career Guidance	11	33.3%
GED Specific	11	33.3%

In comparing Tables 35 and 38, we note a tendency toward broad coverage of the curriculum rather than depth in any particular subject, with the possible exception of Math: Applications and Math: Advanced. There is no difference in this pattern for technology-rich and technology-poor provider organizations, so financial considerations may not be a primary factor. The pattern even holds for experienced, technology-rich provider

organizations. This suggests an overall level of satisfaction with current software, or at least a level of comfort[28]. This satisfaction does not apply to all subject areas, however.

There was little consensus among the respondents about the specific content topics for which they are seeking software. Their comments about subject software are summarized below.

> Reading: Need computer-based, "adult-oriented, illustrated books with speaking text capability" (similar to children's products published by Discis) with interspersed comprehension questions.
>
> Need software featuring low level reading material on topics of interest to adults.
>
> Need reading comprehension software featuring whole texts.
>
> Many programs offer reading basic skills instruction that are "too childish or move too quickly."
>
> Need voice-assisted phonics instruction for non-readers.
>
> Need voice-assisted software for low-level readers.
>
> Writing: Writing skills is an area of the curriculum in need of better instructional approaches.
>
> Need creative writing tools with "story starters" that encourage the writing of poetry and short stories.
>
> Language Arts: Need software that fits the whole language approach (combining reading and writing).
>
> Spelling: This is an area of the curriculum in need of better instructional approaches.
>
> Need programs that assume a very low entry level of spelling proficiency.
>
> Vocabulary Development: Need voice-assisted products for non-readers.
>
> Life Skills: This is an area of the curriculum in need of better instructional approaches.
>
> Need simulations on self-esteem and goal setting.
>
> Need software that addresses wise purchase decisionmaking and software presenting decisionmaking simulations.

---

[28] A note of caution is in order here. This level of comfort with current software may be due, in part, to the reluctant acceptance of software products that were not designed for adult literacy and acceptance of the fact that high quality, adult-specific software products are rare.

Need interactive video-based simulations of life skills situations.

Need to incorporate life skills into standard academic subjects software.

Mathematics: Math problem solving is an area of the curriculum in need of better instructional approaches. Need software focusing on problem solving strategies.

Need a calculator tutorial that utilizes touch screen technology.

Need Algebra and Geometry software.

Social Science: Need U.S. and World History software featuring simulation and critical thinking.

Problem Solving: Need products focusing on critical thinking skills and strategies.

GED and ESL Software

Of the 24 provider organizations serving GED preparation students, 15 use GED-specific software (62.5%). Of the 23 organizations serving ESL students, 13 use ESL-specific software (56.5%). A comparison of technology-rich and technology-poor organizations suggests that cost is a major factor in these relatively low frequencies. (See Tables 39 and 40, below through page 38).

Table 39. -- Provider Organizations with GED Student Populations that Use GED-specific Software: Technology-rich and Technology-poor

Level of Access	Number of Organizations Using GED-specific Software	Percent of N
Technology-rich:		
15 or more computers (N=13)	10	76.9%
Technology-poor:		
Less than 15 computers (N=11)	5	45.5%

For some technology-poor provider organizations, the cost of quality GED-specific software may be prohibitive.

Table 40. -- Provider Organizations with ESL Student Populations that Use ESL-specific Software: Technology-rich and Technology-poor

Level of Access	Number of Organizations Using ESL-specific Software	Percent of N
Technology-rich:		
15 or more computers (N=13)	10	76.9%
Technology-poor:		
Less than 15 computers (N=10)	3	30.0%

For some technology-poor provider organizations, the cost of quality ESL-specific software may be prohibitive, and may require a change in computer platform or the addition of hardware.

Experience with technology may be a factor in the decision to use ESL-specific software, but this does not appear to be the case for GED-specific products. For example, a much higher percentage of technology-experienced, technology-poor organizations serving ESL students reported using ESL-specific products (60 percent) than did technology-novice, technology-poor organizations (0 percent). However, a lower proportion of technology-experienced, technology-poor organizations serving GED students reported using GED-specific products (one third) than did technology-novice, technology-poor organizations (60 percent). A possible explanation is that ESL-specific software may require greater teacher-student interaction and curriculum integration skill than does GED-specific software.

As a measure of user satisfaction with the software they currently use, we sought answers to the following questions:

> How many of the provider organizations who currently use GED-specific software are still seeking additional products?
>
> How many of the provider organizations who currently use ESL-specific software are still seeking additional products?

Here, level of experience with technology proved to be an important factor, as shown in Tables 41 and 42 (page 39).

Table 41. -- Provider Organizations with GED Student Populations that Use GED-specific Software and Seek More: Technology-experienced and Technology-novice

Level of Experience	Number of Organizations Seeking GED-specific Software	Percent of N
Technology-experienced:		
More than 3 years (N=10)	5	50.0%
Technology-novice:		
3 years or less (N=5)	0	0.0%

Table 42. -- Provider Organizations with ESL Student Populations that Use ESL-specific Software and Seek More: Technology-experienced and Technology-novice

Level of Experience	Number of Organizations Using ESL-specific Software	Percent of N
Technology-experienced:		
More than 3 years (N=11)	8	72.3%
Technology-novice:		
3 years or less (N=2)	0	0.0%

We expect that technology-experienced organizations are likely to have higher standards of quality than technology-novice organizations. Why might half of the technology-experienced organizations seek additional GED software? Perhaps some seek GED software of a certain type or that covers certain GED exam topics in more depth. ESL-specific is likely an underserved market.

Comments from provider organization representatives about GED-specific and ESL-specific software needs about are summarized below[29].

> GED-specific: Get away from software that presents a "textbook on screen."
>
> Need software featuring questions that model the level and formats of the actual GED exam.

---

29 Most respondents did not make distinctions among different ESL student sub-populations. However, ESL experts note that beginning and more advanced ESL students have great differences in abilities related to vocabulary and language development, and, therefore, different instructional needs. Differences in the needs of ESL students who are literate in their native languages and those who are illiterate are also becoming recognized. To date, little software is available that reflects these differences among ESL student sub-populations.

Preparation for the GED's new essay component is an area of the curriculum in need of better instructional approaches.

Need GED software focusing on science and social studies topics.

Need GED-specific diagnosis and prescription software.

Need GED software that assumes diagnosis will be accomplished by other means. "We would like more material that teachers can use on a prescriptive basis, based on the*teacher's* assignment or the *student's* own desire to strengthen skills in a particular area.

ESL-specific: In general, this is an area of the curriculum in need of better instructional approaches. There is "not much effective stand-alone software." "It is difficult to find anything of quality for ESL." ESL is one of the student populations it is "most difficult to serve well through the use of technology."

ESL software should have procedural directions and tutorial explanations "in a switchable bilingual format."

ESL software should take advantage of human speech capability.

Need voice-assisted phonics instruction.

Need pronunciation software (which would require speech recognition and, therefore, may be cost prohibitive at present).

Need voice-assisted vocabulary development.

Need grammar programs that address ESL students' gaps in Standard English grammar rather than attempting to address all skills in a fixed sequence.

Need an ESL-specific grammar checker.

Need engaging adventure games where students work together and use English.

Need simulations that are relevant to the lives of immigrants -- to encourage English language practice.

Need ESL-specific diagnosis and prescription software.

Need ESL-oriented Writing Skills, Math: Applications, Math: Advanced Topics, Vocation-specific Skills, Life Skills, and GED software

Software for Workplace Preparation and Workplace Literacy

Sixty percent of the organizations with Workplace Preparation or Literacy program use Vocation-specific Skills software (15 of 25). Fewer of these organizations use Career Guidance software (14 of 25, or 56%) or Pre-employment and Work Maturity Skills software (10 of 25, or 40%).

A comparison of technology-rich and technology-poor organizations suggests that cost is a major factor in these relatively low frequencies. (See Tables 43 through 45, below through page 42).

Table 43. -- Provider Organizations with Workplace Programs that Use Vocation-specific Software: Technology-rich and Technology-poor

Level of Access	No. of Organizations Using Vocation-specific Software	Percent of N
Technology-rich:		
15 or more computers (N=15)	12	80.0%
Technology-poor:		
Less than 15 computers (N=10)	3	30.0%

Table 44. -- Provider Organizations with Workplace Programs that Use Career Guidance Software: Technology-rich and Technology-poor

Level of Access	No. of Organizations Using Career Guidance Software	Percent
Technology-rich:		
15 or more computers (N=15)	10	66.7%
Technology-poor:		
Less than 15 computers (N=10)	2	20.0%

Table 45. -- Provider Organizations with Workplace Programs that Use Pre-employment/Work Maturity Software: Technology-rich and Technology-poor

Level of Access	Number of Organizations Using P/WM Software	Percent
Technology-rich:		
15 or more computers (N=15)	10	66.7%
Technology-poor:		
Less than 15 computers (N=10)	0	0.0%

The lower percentage usage of Career Guidance and Pre-employment/Work Maturity software may be because workplace programs at some adult literacy provider organizations focus solely on preparation for specific jobs and do not involve general workplace literacy skills (e.g., job etiquette, choosing a career).

In general, experience with technology does not appear to be a factor in current usage of workplace-related software. For example, the usage percentages for technology-poor, technology-experienced organizations are consistently lower than the percentages for technology-rich, technology-novice organizations.

As a measure of user satisfaction with the software provider organizations currently use, we sought answers to the following questions:

> How many of the organizations who currently use Vocation-specific software are still seeking additional products?
>
> How many who currently use Career Guidance software are still seeking additional products?
>
> How many who currently use Pre-employment and Work Maturity software are still seeking additional products?

Here level of experience with technology does appear to be an important factor, as shown in Tables 46-48 (pages 43-44).

Table 46. -- Provider Organizations with Workplace Student Populations that Use Vocation-specific Software and Seek More: Technology-experienced and Technology-novice

Level of Experience	Number of Organizations Seeking Voc.-specific Software	Percent of N
Technology-experienced:		
More than 3 years (N=10)	4	40.0%
Technology-novice:		
3 years or less (N=8)	1	12.5%

Table 47. -- Provider Organizations with Workplace Student Populations that Use Career Guidance Software and Seek More: Technology-experienced and Technology-novice

Level of Experience	Number of Organizations Seeking Career Guidance Software	Percent of N
Technology-experienced:		
More than 3 years (N=9)	3	33.3%
Technology-novice:		
3 years or less (N=3)	0	0.0%

Table 48. -- Provider Organizations with Workplace Student Populations that Use Pre-employment/Work Maturity Software and Seek More: Technology-experienced and Technology-novice

Level of Experience	Number of Organizations Seeking P/WM Software	Percent of N
Technology-experienced:		
More than 3 years (N=8)	6	75.0%
Technology-novice:		
3 years or less (N=4)	0	0.0%

The data suggest that technology-experienced organizations are the most satisfied with Career Guidance software and the least satisfied with Pre-employment/Work Maturity products. Pre-employment/Work Maturity may well be a subject underserved by the current adult literacy software supply.

Comments from provider organization representatives about follow.

> Vocation-specific: This is an area of the curriculum in need of better instructional approaches.
>
> Career Guidance: Need career guidance software that is targeted specifically for adults and provides a realistic idea of the demands of the vocation and the skills required, and that is not overly expensive.
>
> Need software that makes the connection between careers and community college offerings.
>
> Need software addressing promising careers.
>
> Need career interest and aptitude assessment software.
>
> Pre-employability/Workplace Maturity: These subjects can be better addressed with multimedia.
>
> Need software that simulates workplace situations as a means of practicing pre-employability and workplace maturity skills
>
> Need software addressing how to get along on the job.

Parenting Skills

Only 2 of 19 of organizations that have family literacy programs use Parenting Skills software (10.5%). In addition, two other organizations that do not have family literacy programs use such software. Of the 4 organizations that currently use Parenting Skills software, 3 have ILSs that offer such software, and 2 report using stand-alone software.

One likely reason for the low percentage usage of Parenting Skills software is the relative newness of family literacy as an adult literacy program phenomenon. Another is lack of software. IESD analysts were able to identify only a handful of locally-developed, stand-alone Parenting Skills products (not included in the database described in Chapter 1). And as noted previously, only 2 of 9 ILSs were identified that offer a Parenting Skills curriculum.

In partnership with Apple Computer, the National Center for Family Literacy has been researching how computer-based technology can be effectively used in family literacy programs. Their strategy has been to use word processing and selected commercially-available early childhood software products as vehicles for "Parent and Child Together" time.

Of the 17 provider organizations with family literacy programs that do not currently use Parenting Skills software, 7 seek such products or have sought them without success (41.2%). The vast majority of these are experienced, technology-rich organizations.

Comments from representatives of provider organizations are as follows.

> Need software that combines parent and child learning (with low-level reading for adults).
>
> Need software that encourages parents and children to work together.
>
> Need software that helps parents cope with the frustrations of parenthood.

Learning Systems

This section focuses on the use of Integrated Learning Systems (ILSs) and other learning systems.

ILSs

Of the 33 adult literacy provider organizations surveyed, 8 use ILSs. Specifically mentioned were WICAT, Jostens, Wasatch, TRO/PLATO, and CCC. When discussing the positive aspects of ILSs, these organizations most often mentioned the following:

* The *breadth of the content* offerings (see Table 19 on page 13). Because of ILSs' broad content coverage, they provide ample practice and reinforcement in many topics taught in adult literacy classes and can "fill in the gaps" in the provider organization's curriculum.

* An *automated management system* that, in some ILSs, provides placement assessment, diagnosis, prescriptive assignment of *self-paced, individualized instruction*, and posttesting. Correlation to standard adult literacy tests (see Table 20 on page 14) is likely viewed as an important benefit.

* *Positive effects on student attitudes*. Students are motivated by the immediate feedback, by the attractive graphic presentations (when adult appropriate), by the fact that (when assignments are at the appropriate level) they proceed with success, by the level of privacy that ILS-based instruction affords, and by the very experience of using a computer.

Among the negative aspects cited were the time required for curriculum integration and technical problems with ILSs delivered via telecommunications.

Seven organizations considered an ILS but decided against purchase. One of the most often-cited explanations was that the systems are too expensive. Comparing the provider organization budget data presented in Table 29 (page 24) with the ILS cost data presented in Table 21 (page 14), it becomes apparent that all of the technology-poor and many of the technology-rich organizations cannot afford an ILS without special grant support.

Another explanation for not considering an ILS is that they are thought to be incompatible with some provider organizations' instructional methods (e.g., "seeking [but not finding] a whole language approach"; "not flexible, not adult-oriented, not creative; "little application"). This dissatisfaction with ILS instructional methods reflects many ILS's historical overreliance on drill and practice, and multiple choice formats -- and a lack of familiarity on the part of provider organizations with all of the ILSs available on the market and how they have changed over time. Some ILSs now offer a balanced mix of tutorial and drill. Some ILSs are moving towards more tool-based instruction, and one (Wasatch) is primarily tool-based. Because ILSs are regularly updated, they should be viewed as constant works-in-progress. A system that is evaluated by a provider organization one year may be quite different in approach a few years later. However, pre-purchase reviews conducted by provider organizations by visiting the nearest provider site with a system under consideration can be misleading because some older installations have not been regularly upgraded.

CCP

Only 4 of the organizations surveyed currently use CCP. When discussing the system's positive aspects, these organizations most often mentioned that it:

* Provides a *system of instructional management* that provides cross-referencing of on-computer and print-based instructional materials and maintains student performance records (but not automatically; see page 15).

* Provides a *means for students to work independently*, thereby promoting independent learning and *freeing teachers to work with students needing more personal attention.*

Other positive aspects receiving mention include: the breadth of content coverage; a pedagogically sound instructional sequence; instant feedback from scanned tests; self-motivated students; the fact that the system is adult-oriented; and built-in speech for ESL instruction.

Among the negative aspects cited were:

* The cost of the system, including installation and staff training (see Table 22 on page 16).

* The staffing required for effective implementation because the system is not fully automated; in addition, until recently, CCP required labor-intensive quarterly reports to U.S. Basics's headquarters (no longer required).

* Some mismatches between instructional and testing materials and the needs and goals of individual provider sites (e.g., CCP-ESL is too simple for [our] advanced students"; "initial testing doesn't have enough reading"). Provider organizations that invest in CCP may not have funds to purchase additional software not available through CCP, and their software offerings represent only 28.5% of the available supply of Apple II software and only 22.8% of the available supply of MS-DOS software.

Five organizations considered CCP but decided against purchase. The most often-cited explanation was that the system is too expensive.

IBM PALS -- Only 2 organizations are currently using PALS. This program's multimedia-based, animated cartoon story is viewed as appealing to some students -- especially students without other interests. However, other adult students regard the approach as "babyish" and, therefore, insulting. One weakness noted was the limited range of skills addressed. (PALS is intended for students with no or very limited reading ability.)

Ten organizations considered PALS but decided against purchase. The most often-cited explanation was that the program is too expensive. Another reason given was the limited range of skills addressed.

Software Types: What Provider Organizations have Previously Purchased, How They Use It, and What They Seek

Software Types Previously Purchased

Table 49 (page 48) represents the software types that have been purchased by over half of the provider organizations.

Table 49. -- Software Previously Purchased: Types Most Frequently Mentioned by Adult Literacy Provider Organizations N=33

Subject	Number of Organizations	Percent
Word Processor	29	87.9%
Drill	29	87.9%
Tutorial	27	81.8%
Educational Game	25	75.8%
Database	24	72.7%
Spreadsheet	24	72.7%
Desktop Publishing/Printing	18	54.6%
Simulation	17	51.5%
Problem Solving	17	51.5%

A greater percentage of the experienced, technology-rich organizations have Simulation and Problem Solving type software than the other organizations. (Note that products were classified by *type* as Problem Solving if they require students to a fashion a solution to a problem by synthesizing various pieces of information and combining different previously mastered skills. Products can fall within any subject area and be classified Problem Solving as the software type. This is distinguished from Problem Solving as a *subject*; products so categorized have applicability across several subject domains and have general problem solving strategies as their focus.)

Less than 40% of the organizations have Programs Using Speech (12 of 33), Authoring Tools (11 of 33), Telecommunications (10 of 33) or Multimedia (8 of 33) software. A few definitions are in order.

> Programs Using Speech: Any product using digitized human speech (e.g., to provide feedback or help in a tutorial) or synthesized robotic or near-human speech (e.g., to provide a talking word processor).
>
> Authoring Tools: Products that enable users to develop their own software or that provide a software practice activity "shell" and enable users to fill in the content that will be practiced.
>
> Multimedia: Products that combine the standard capabilities of the microcomputer with interactive video and/or photorealistic graphics. They often provide realistic audio (voice or other sound) as well.

The data suggest that cost may be a factor for Programs Using Speech[30] and Multimedia[31]. (See Tables 50 and 51 on pages 49-50.) While cost is probably a factor for Telecommunications software (see Table 33 on page 29), level of experience may be another factor. (See Table 52 on page 50.)

Table 50. -- Previous Purchase of Programs Using Speech: Technology-rich and Technology-poor

Level of Access	Number of Organizations that Previously Purchased	Percent of N
Technology-rich:		
15 or more computers (N=17)	10	58.8%
Technology-poor:		
Less than 15 computers (N=16)	2	12.5%

Many programs using speech require the purchase of a hardware peripheral. Others may require newer, upgraded computers.

30 Inaam Mansoor, Director of the Arlington (VA) Education and Employment Program (REEP), notes that adult literacy organizations suffer from incompatibility among competing MS-DOS speech boards. Many software products offering human speech are compatible with only some of the popular speech boards. Thus, even after purchasing a speech board, adult literacy organizations cannot take full advantage of all the speech-assisted products available in the marketplace. This situation may act as a disincentive to purchasing speech boards and Programs Using Speech.

31 Experience with technology is less likely to be a factor for Programs Using Speech and Multimedia. For example, a smaller proportion of technology-poor, technology-experienced organizations reported using these software types than technology-rich, technology-novice organizations.

Table 51. -- Previous Purchase of Multimedia Software: Technology-rich and Technology-poor

Level of Access	Number of Organizations that Previously Purchased	Percent of N
Technology-rich:		
15 or more computers (N=17)	8	47.1%
Technology-poor:		
Less than 15 computers (N=16)	0	0.0%

Use of multimedia software requires the purchase of additional hardware.

Table 52. -- Previous Purchase of Telecommunications Software: Technology-experienced and Technology-novice

Level of Experience	Number of Organizations that Previously Purchased	Percent of N
Technology-experienced:		
More than 3 years (N=21)	8	38.1%
Technology-novice:		
3 years or less (N=12)	2	16.7%

Telecommunicating often requires the ability to cope with "less-than-friendly" interface design and the confidence of an explorer that typically comes with experience.

How Provider Organizations Use Productivity Software

Since productivity software products are open-ended by design (i.e., they can be used to meet a variety of objectives), it is important to understand how provider organizations are using them for instructional purposes. In general, the data reported from the provider organizations is disappointing -- productivity products are not being exploited to their fullest by most organizations.

Word processing software. About 80% of the provider organizations that have purchased word processing products have students use them to complete assigned compositions and for their own personal writing. No other use was mentioned by more than 6 of 29 organizations.

Other uses include: creating "experience stories" with students of limited writing ability (i.e., the teacher takes students' dictation), practicing basic writing skills, practicing text revision skills, learning word processing as a vocational skill, resume writing, keyboarding practice, writing across the curriculum (e.g., writing as a pre-reading activity, writing to explain how math problems were solved), and word processing as a component of general computer literacy. In addition, two teachers indicated they use word processors to create instructional print materials. Technology-experienced organizations report more uses than technology-novice organizations. Sharing of information among provider organizations or other forms of staff development would likely increase the pool of word processor instructional applications available to each organization.

Database software. Over half the provider organizations that own database software (13 of 24) report that they do *not* use it for instructional purposes. Five organizations (all technology-experienced) indicated that they use it for administrative purposes. For some organizations, their database software is part of an integrated productivity package that was probably purchased primarily for its word processing function.

No instructional use was mentioned by more than 4 of 24 organizations. These include: understanding database software as a component of computer literacy, databasing as tool for students to organize their own personal information, databasing as a vocational skill, providing access to employment data, and enabling students to view their own attendance information. Uses that are commonplace in high schools -- such as comparing classes of data in social studies and science -- were not mentioned.

Spreadsheet. Half the provider organizations that own spreadsheet software (12 of 24) report that they do *not* use it for instructional purposes. Six organizations (all technology-experienced) teach spreadsheet software as an employability skill (e.g., learning *Lotus 1-2-3*). Five organizations (all technology-experienced) indicated that they use it for administrative purposes. As with database software, spreadsheet programs are included in many integrated productivity packages and may not be the main reason for purchase.

No instructional use was mentioned by more than 3 of 24 organizations. These include: understanding spreadsheets as part of computer literacy, creating tables and graphs of student-gathered data (e.g., maintaining a household budget; planning a business), and making cultural comparisons (in an ESL class). As with word processing and database software, most organizations are underutilizing spreadsheet software.

Desktop publishing/printing. Of the 18 provider organizations that own Desktop Publishing/Printing (including professional quality page layout products as well as multipurpose printing tools such as Broderbund's *The Print Shop*, 14 (77.8%) report using such products for instructional purposes. However, no particular instructional use was mentioned by more than 5 organizations. Students use such products to create newspapers and journals, to create presentation quality printed "products" for their own personal purposes, and as a part of vocational training in the printing trade. Teachers use Desktop Publishing/Printing products to create printed instructional materials and to create

presentation-quality printouts of student work. Administrative uses (2 of 18 organizations) include creating invitations to prospective students, announcements, bulletins, and newsletters.

Authoring tools. Approximately half of the provider organizations with Authoring Tools (6 of 11) report that they are either *not using such products at all or are not using them for instructional purposes*. No particular instructional use was mentioned by more than 1 organization. These include: creating printed instructional materials (referring to a crossword puzzle-making product); developing interactive, computer-based, instructional material; and using a hypermedia tool as a means of integrating instructional software on a network (i.e., creating menu-based links to move from one software product to another). One administrator mentioned beginning development of interactive, computer-based, instructional material but stopping because other responsibilities took too much time. We suspect that lack of time is a major stumbling block to locally-developed interactive instruction using authoring tools -- especially for organizations with few instructional staff members. For most organizations, there are no funds available to free educators from other responsibilities to develop their own software.

To gain a better understanding of the software types in use by the provider organizations, we re-analyzed the data on products provider organizations use and would recommend to other organizations -- this time focusing on the distribution by type. This provides a good sense of the software products that provider organizations use on a fairly regular basis. The distribution by software type for technology-novice and technology-experienced organizations is presented in Table 53 (below).

Table 53 — Distribution of All Recommended Products by Type for Novice and Experienced Organizations*

Software Type	Supply of Adult Literacy Products N=1372		Novice Sites N=93		Experienced Sites N=195	
	No.	Percent	No.	Percent	No.	Percent
Drill	845	61.6%	79	84.9%	139	71.3%
Tutorial	623	45.4%	46	49.5%	62	31.8%
Simulation	75	5.5%	0	0.0%	11	5.6%
Problem Solving	121	8.8%	21	22.6%	37	19.0%
Game	122	8.9%	6	6.5%	21	10.8%
Productivity	314	22.9%	12	12.9%	46	23.6%

* The sum of all percentages is greater than 100% because some products have been classified into more than one software type.

A few differences between technology-novice and technology-experienced provider organizations are worth noting. For technology-novice organizations, Drill and Tutorial products represent higher percentages of all products in use, compared to Drill and Tutorial products as percentages of all products used by technology-experienced organizations. Drill and Tutorial products apparently play a more important instructional role for technology-novice organizations. In contrast, no Simulation products (zero) are in active

use by such organizations. (The role of the instructor is often key to the success in effective use of Simulation software. It is likely that many technology-novice instructors would be intimidated by the challenges Simulation software present, especially if they have not received training.)

For technology-experienced organizations, Productivity products represent a higher percentage of all products in use, compared to Productivity products as a percentage of all products used by technology-novice organizations. Productivity products would seem to play a more important instructional role for technology-experienced organizations.

For technology-novice and technology-experienced organizations alike, Problem Solving type software products represent a higher percentage of all products in use, compared to Problem Solving products as a percentage of all products in the adult literacy marketplace. While our sample of provider organizations have not used all 121 of the Problem Solving products on the market, the available supply of this software type may not match need.

Software Types Highly Recommended

We re-analyzed the data on software products provider organizations indicated they would most highly recommend to other organizations -- focusing on software types. The distribution by type for technology-novice and technology-experienced organizations is presented in Table 54 (below).

Table 54 — Distribution of Highly Recommended Products by Type for Novice and Experienced Organizations*

Software Type	Supply of Adult Literacy Products N=1372		Novice Sites N=55		Experienced Sites N=69	
	No.	Percent	No.	Percent	No.	Percent
Drill	845	61.6%	49	89.1%	43	62.3%
Tutorial	623	45.4%	41	74.5%	19	27.5%
Simulation	75	5.5%	0	0.0%	5	7.2%
Problem Solving	121	8.8%	9	16.4%	16	23.2%
Game	122	8.9%	3	5.5%	10	14.5%
Productivity	314	22.9%	5	10.9%	24	34.8%

* The sum of all percentages is greater than 100% because some products have been classified into more than one software type.

In general, the differences noted above for software "in use and recommended" are reflected here as well, except that the differences in preferences when the standard is "highly recommended" are even more pronounced. Not surprisingly, technology-novice provider organizations highly value software that places few demands on teachers (i.e., Drill and Tutorial). Technology-experienced organizations value a wider variety of software types.

These data suggest the importance of staff development for technology-novice organizations. They also suggest that as provider organizations become more knowledgeable about software, the demand for more open-ended, teacher-intensive products is likely to rise.

Software Types Provider Organizations Seek to Purchase

Table 55 (below) shows the most frequently-mentioned types of software adult literacy provider organizations expressed interest in purchasing.

Table 55. -- Software Sought for Purchase: Types Most Frequently Mentioned by Adult Literacy Provider Organizations N=33

Software Type	Number of Organizations	Percent
Multimedia	16	48.5%
Programs Using Speech	15	45.5%
Problem Solving	15	45.5%
Simulation	13	39.4%
Authoring Tool	11	33.3%

Experienced, technology-rich organizations account for over half of the organizations seeking Multimedia and Authoring Tools (the same group that has most of the newer technology hardware). The vast majority of organizations seeking Programs Using Speech are technology-experienced.

Less than a third of the organizations identified Educational Game, Desktop Publishing/Printing, Drill, Tutorial, Telecommunications, Database, Spreadsheet, and or Wordprocessor software.

Comments from provider organizations on software types follow.

> Database software: Need databases of adult-oriented resource material (e.g., nutrition, parenting, black history) written for low level readers (reading grades 2 -3) with human voice assistance.
>
> Authoring tools: Need a product that allows text input via a scanner into a "reader" program that can speak the text.
>
> Problem solving: Need products designed for low level readers (reading grades 2-4) of high interest to adults.
>
> Simulations: Looking forward to products that...simulate actual real life conditions (e.g., at work, in the community) where literacy skills are required.

Characteristics Provider Organizations Seek in Software for Adult Education

Respondents were asked to identify the characteristics that help determine the software products their organizations will purchase. The characteristics they named can be grouped into three general categories:

* Software Content
* Instructional Quality and Methodology
* Technical Quality

The results for each of these categories are discussed below.

Software Content

Approximately 75% of the respondents (25 of 33) mentioned that the software products they purchase should have content that is appropriate for the specific adult student population with which they intend to use it. For subjects such as Reading Comprehension, Writing, and ESL, this strongly suggests the need for software products designed specifically for adults.

Other frequently-mentioned content characteristics include: content that supports the provider organization's curriculum; and content that is accurate.

Instructional Quality and Methodology

Opinions about desired characteristics of instructional quality and methodology varied greatly from organization to organization. Over 60% of the respondents (21 of 33) mentioned that the instructional approach should be appropriate for the specific adult student population with which they intend to use the product. About half felt that graphics should enhance the instructional process (17 of 33), feedback should be informative and appropriate for the intended adult student population (16 of 33), and/or the instructional aspects of the software should make it easy for students to proceed without confusion or frustration (16 of 33). Consistently, the percentage of technology-rich provider organizations finding these characteristics important was higher than the percentage of technology-poor, as represented in Table 56 (page 56).

Table 56. -- Frequently Mentioned Instructional Quality and Methodology Characteristics: Technology-rich and Technology-poor Provider Organizations

Instructional Characteristic	Technology-rich Orgs (N=17)		Technology-poor Orgs (N=16)	
	No. of Orgs	Percent of N	No. of Orgs	Percent of N
Instructional approach should be adult appropriate	14	82.4%	8	50.0%
Graphics should enhance instructional process	12	70.6%	5	31.3%
Feedback should be appropriate to intended student population	10	58.8%	6	37.5%
Feedback should be informative	10	58.8%	6	37.5%
Students should be able to proceed without confusion or frustration[32]	10	58.8%	6	37.5%

Respondents also frequently noted that students should be able to alter the program's sequence or pace, that students should be active participants in the learning process, that the learning process should be student-directed, that the software should be useful in the instructional settings offered by the adult education provider organization, and that teachers should be able to easily modify the program's content.

Some individual comments reflected the importance of instructional management issues:

> Software should be easy to manage.
>
> Software should offer pretesting and posttesting.
>
> There should be a "bookmarking" capability, enabling students to stop in the midst of an activity, save the work in progress, and easily access the program at that point during the next session.

---

32 The responses of technology-poor, technology-experienced organizations were similar to the technology-rich organizations for this instructional characteristic. Approximately 60 percent of technology-poor, technology-experienced organizations mentioned this characteristic.

Software should provide performance reporting.

Software should refer students to corresponding printed material.

In general, more of the technology-experienced organizations demonstrated an interest in issues related to instructional design and learning theory.

Instructional Design: Software products should use a consistent method.

The screen should be uncluttered.

The design should be non-linear. Programs should branch according to student needs.

Programs should offer a variety of instructional treatments for the same content.

Software should be highly interactive.

Feedback should promote thinking.

Learning Theory: Software should address higher order thinking skills.

Activities should be applicable to the real world.

Software should enable students to develop their own "knowledge bases," which they can access as needed.

Software should "reflect how each student's brain works" (multiple modalities).

The responses strongly suggest that the software selection standards of most technology-experienced provider organizations are significantly higher than the standards of technology-novice organizations.

Only one respondent actually mentioned measurable learner outcomes as an important issue (i.e., "Do students actually learn the content?"). This lack of interest in learner outcomes may reflect the attitude that adult educators, and not technology by itself, are ultimately responsible for learner outcomes.

Technical Quality

Approximately 75% of the respondents stressed that software they will purchase should be easy to use. About 60% felt that software should run consistently under all normal conditions and should be "bug-free." (We suspect that the remaining respondents agree with this criterion for technical quality but did not mention it because it is so obvious a requirement.) Many respondents (14 of 33) also noted the importance of graphics that are clear and easy to interpret.

Overall Judgments About Computer-based Technology and Software

Based on their experience using computer-based technology with adult education students, the provider organizations surveyed for this report have formulated opinions as to its positive and negative aspects. This section presents a summary of opinions.

Positive Aspects

About half of the provider organizations (17 of 33) indicated that technology's ability to motivate adult learners is a major strength. Specific benefits mentioned related to motivation include the following.

> Technology offers the ability to empower students -- to give them a sense of mastery over their surroundings.
>
> Use of technology increases student self-esteem.
>
> Students enjoy writing on the computer, are less reluctant to edit, and "love getting their printed results."
>
> Computer-based technology represents a "new approach, unrelated to past failures."
>
> Software is visually attractive to students.
>
> Students receive feedback as they need it -- not only when an instructor happens to be available. Well designed software is "patient and offers non-judgmental feedback."
>
> Mastery of computers is something many students feel is important to their future -- to their success in the job market. Technology helps attract more higher level students (e.g., beyond ABE 1) because it erases the "stigma of adult literacy."

Aside from this, there was surprisingly little agreement as to the other positive aspects of incorporating technology into the curriculum. One reason for this may be the critical importance of motivation in the ultimate success of adult learners. Some adult educators may focus so much on technology as a motivational tool that they do not concern themselves much with other issues.

Other positive aspects mentioned include: increased learning; faster rates of learning; improved academic skills reinforcement; a means of promoting of critical thinking; the ability to individualize instruction; a means for students to work independently; an alternative to a "teacher-centered" approach; step-by-step instruction for students with learning disabilities; increased time on task; a means of offering privacy for reticent learners; computer literacy as a goal in itself; a variety of instructional approaches and learning modalities; some models of excellent pedagogical techniques; a means of broadening the range of academic skills that are covered; excellent entry-level job training; a means of providing educational equity; a system for effective instructional management; and a means of providing assistance to outreach sites.

Negative Aspects

There was little consensus as to the negative aspects of using computer-based technology in adult education. Less than a third of all respondents mentioned any one particular problem. However, most frequently-cited were:

* Cost of hardware and software:

  "Cost of purchasing and upgrading."

  "Not enough money to buy computers and software"

  "Expense"

* Problems related to teacher staff development:

  "Time and effort to train teachers and aides and to get them to use [technology] as it should be [used]"

  "Training staff to use hardware and new software packages"

  "Teacher training problems on sophisticated software"

  "Time constraints [for teacher training] are very real in an hourly paid program in which people have multiple commitments."

  "Lack of instructor time for training. When they do not know what is available, then they cannot use the resources."

  "The teachers have sometimes felt frustrated because they often have not had enough time or background to learn [software] programs."

* Problems related to integrating technology with the existing curriculum:

  "Time necessary to effectively integrate software into overall program"

  "The time involved in learning the software and then integrating it with our other materials is GREAT."

  "Takes up staff time."

* Problems administering and maintaining the hardware and software collection:

  "It's a lot of work."

  "It's expensive to maintain equipment."

  "Floppy disk problems. Students [are] careless with equipment."

"Maintenance and repair of hardware"

"...scheduling the computer for use during [a part-time employee's] working schedule is sometimes difficult."

"Security has become a problem. (A printer was stolen.)"

"...need for [a] staff person to oversee and organize all [software and hardware] we own or enough staff development time to tackle [this] as a group project"

Other negative aspects mentioned include:

* The low quality or inappropriateness of some of the software available:

  "We've decided not to be satisfied with purchasing packages since [they're] mostly geared toward children or too difficult or not of interest/relevance to our students. We are therefore designing our own activities."

  "Quality of CBI not outstanding"

  "Fear of use by tutors and students -- software that is supposed to be basic but takes a computer whiz to figure out"

  "Lack of appropriate software: for adults for specific subjects"

  "Technical difficulties ('glitches'). Packages do not seem to be all they are advertised to be!"

* Too few computers available

* Too little software or too few copies of software available.

  "[High] cost to duplicate [software] programs for many outreach sites"

  "Lack of specific subject matter software"

* Laziness on the part of some students and teachers

  [Students want to] "play games."

  "...there is the danger of [teachers] being lazy in instructional practice -- and expecting the computers to teach.

CONCLUSIONS

This section presents a summary of conclusions based on the data presented in Chapters 1 and 2.

Technology Hardware

The data suggest that there are insufficient numbers of computers available to most adult literacy provider organizations to make technology-based learning an integral part of the adult education experience. The hardware deficit is probably the worst for community-based organizations.

With the possible exception of provider organizations that are part of the public school system and some public college-based organizations, purchase of additional computers is likely to be highly dependent on grant support (government and/or private).

Few provider organizations use the newer computer-related technologies (e.g., videodisc players, CD-ROM, speech boards or boxes). Organizations that are the poorest with respect to current access to computers (less than 15 computers) also typically have the least access to the newer technologies. Few of the provider organizations with modems use them directly with students for instructional purposes.

Besides computer-related technology, many provider organizations use videocassette and audiocassette technology as instructional tools. Some take advantage of television as well. A few allow students to use camcorders as a means of communication.

Software for Adult Literacy

Software in Specific Subjects

The data suggest that most adult literacy provider organizations that use computers for instructional programs use Keyboarding software products, and software for all topics within the Reading/Language Arts and Mathematics curricula. Experienced, technology-rich organizations are more likely than other organizations to use software to cover a broader range of subjects.

Regarding software that provider organizations seek, most organizations seem more focused on broad coverage of the curriculum than on depth in any particular subject, with the possible exception of Mathematics products that go beyond basic skills. (The concern for breadth of coverage is also a prime motivation in the purchase of larger learning systems, such as ILSs and CCP.)

Subjects that are underserved by the available software supply likely include:

* Adult-oriented *Reading and Language Arts* software for non-readers and low-level readers, especially products that take advantage of human or near-human speech

* Adult-oriented *Reading* and *Language Arts* software for students at ABE Level 2.

* Adult-oriented prompted *Writing* activities
* *Life Skills* simulations of typical problems adults must confront
* *Math: Applications* products that present adult-oriented problem situations
* Products that focus on general *Problem Solving* and critical thinking skills and strategies
* *GED-specific* software (see pages 39-40 for areas of likely need)
* *ESL-specific* software, especially products that exploit human speech capability and products that provide bilingual assists to students across the curriculum (see page 40 for areas of likely need)
* *Career Guidance* software designed specifically for adult literacy students (see page 44)
* *Pre-employability/Workplace Maturity* multimedia simulations of problems and issues learners will face on the job
* *Parenting Skills* (see page 45 for likely areas of need)

The cost of high quality GED-specific, ESL-specific, Vocation-specific, Career Guidance, and Pre-employment/Work Maturity software may well be prohibitive for many technology-poor adult literacy provider organizations without supplemental funding. This is likely to be the case for other adult education-specific products developed in the future because the adult education market is so small compared to the general education market.

The different purchasing patterns of technology-experienced and technology-novice provider organizations suggest the need for staff development in software evaluation and technology planning for technology-novice organizations.

Types of Software

The data suggest that most adult literacy provider organizations have previously purchased Drill (including Educational Games), Tutorial, and Productivity software (Word Processing, Database and Spreadsheet). However, Productivity products are not exploited to their fullest for instructional purposes by most provider organizations.

Technology-poor provider organizations are less likely than technology-rich organizations to have purchased Programs Using Speech and Multimedia products -- due, in part, to the cost of the additional hardware required.

Technology-novice organizations primarily rely on Drill and Tutorial software, which make few demands on the teacher. Technology-experienced organizations use and value a wider variety of software types; they highly recommend more Productivity than Tutorial products.

While there is no consensus among provider organizations as to what they seek in additional software, the most frequently mentioned types are software that accommodate multiple learning modalities (Multimedia; Programs Using Speech) and that address higher order thinking skills (e.g., Problem Solving; Simulation). While there is interest in

Authoring Tools, current use of such tools indicates the need for staff development in their use and freeing of time and personnel to use such tools for locally-based software development.

Desired Software Characteristics

The data suggest that most adult literacy provider organizations seek easy-to-use software that is adult-appropriate in content and instructional approach (suggesting the importance of adult-specific software), and that exploits the computer's ability to deliver graphic content and informative feedback as needed.

Some provider organizations (but not a majority) are especially interested in exploiting the computer as an instructional management tool -- for pre-assessment, assignment of instructional materials (including print-based materials), intelligent branching to meet each student's instructional needs, on-going assessment, and performance reporting.

Technology-experienced provider organizations tend to focus on issues related to software design and learning theory -- the details that are likely to make a software product more or less effective. Many technology-novice provider organizations may be in need of staff development in software design and learning theory (as it applies to computer-based instruction).

Positive and Negative Aspects of Computer-based Technology and Software

A majority of adult literacy provider organizations view computer-based technology and software as important tools for motivating students. Student motivation is an essential factor in the eventual success of adult learners. Some organizations (but not a majority) stress technology's positive impact on learning, on instructional process, or on instructional management.

While there is little consensus regarding the negative aspects of using computer-based educational technology, frequently-mentioned issues include: the cost of hardware and software; problems related to staff development; problems related to curriculum integration; and problems administering and maintaining hardware and software collections.

CHAPTER 3

MAKING SOFTWARE PURCHASE DECISIONS FOR ADULT LITERACY: INFORMATION AVAILABLE FOR INFORMED DECISIONMAKING

OVERVIEW

This chapter examines the software purchase decisionmaking process of adult literacy provider organizations and presents an overview of the information sources such organizations consult when making purchase decisions.

The analysis presented in this chapter is based on the responses of adult literacy provider organizations to survey and follow-up interview questions (discussed in detail in Chapter 2, beginning on page 18).

THE SOFTWARE PURCHASE DECISIONMAKING PROCESS

Both administrators and teachers at adult literacy provider organizations are almost always involved in the software purchase decisionmaking process. The precise roles that administrators and teachers play in this process vary from organization to organization. However, the most frequent pattern is for teachers to recommend software and for administrators to purchase it or give approval for purchase (16 of 33 organizations). In some organizations, administrators play a more active role in initial software selection. In others, the entire decisionmaking process is handled by an administrator-teacher committee. Approximately 70% of the organizations surveyed indicated that final purchase decisions are made by administrators and teachers together (23 of 33)[33].

IESD analysts have identified 7 steps that some provider organizations include as part of their decisionmaking process. Frequencies for including each step are presented in Table 57 (page 65).

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[33] We are reasonably confident that this accurately reflects the actual inclusion of teachers in the decisionmaking process. Approximately the same percentage of organizations identified a specific role for teachers when asked to describe the steps in the decisionmaking process. (Interviewers made no reference to teachers when asking the question.)

Table 57 -- Steps Provider Organizations Frequently Include as Part of the Software Purchase Decisionmaking Process (N=30)

Step in the Purchase Decisionmaking Process	Number of Organizations	Percent of N
Consult with colleagues and/or educational technology experts (word of mouth)	25	83.3%
Teachers preview software	23	76.7%
Consult available print and/or online information sources	19	63.3%
Test software with students	17	56.7%
Attend technology conferences and/or shows	15	50.0%
Administrators preview software	15	50.0%
Consult with software publishers' representatives	11	36.7%

Testing software with students typically focuses on questions such as:

Is the software easy to use?

Can students proceed without confusion or frustration?

Are students motivated by the product?

Such testing does not typically address the issue of learning outcomes. Experienced, technology-rich organizations more frequently included testing with students than other organizations.

The decisionmaking process ranged from very cursory (2 steps) to extremely thorough (7 or more steps). The typical provider organization decisionmaking process includes 4 or 5 steps prior to purchase. Two examples of decisionmaking processes are as follows:

Example 1:

1. Consult available print materials
2. Consult with colleagues
3. Teachers preview software
4. Test software with students
5. Purchase software

Example 2:

1. Consult with colleagues and educational technology experts
2. Attend technology conference
3. Administrators preview software
4. Teachers preview software
5. Purchase software

SOFTWARE INFORMATION SOURCES CONSULTED

Word-of-mouth is the only software information source that almost all of the provider organizations typically consult (28 of 33). The most frequently-mentioned word-of-mouth sources are other adult education teachers who have technology experience -- with some respondents indicating that they only rely on sources that have actually used the software in question with students. Other word-of-mouth sources include educators with technology experience who do not serve adult populations, and educational technology conference speakers and participants.

The only other source that more than half the organizations typically consult is software catalogues (17 of 33). However, technology-rich organizations rely more heavily on software catalogues than do technology-poor organizations, as represented in Table 58 (page 67).

Technology-experienced organizations also tended to report a wider variety of sources than technology-novice organizations. One respondent offered a likely explanation:

> "...[organizations] with longer computer experience...have had time to collect and build their software selections....when they...look for new software the choices and sources [are] more critical."

Table 58. -- Provider Organizations that Regularly Consult Software Catalogues: Technology-rich and Technology-poor

Level of Access	Number of Organizations	Percent of N
Technology-rich:		
15 or more computers (N=17)	12	70.6%
Technology-poor:		
Less than 15 computers (N=16)	5	31.3%

The typical use of software catalogues is not as the final word about software but, rather, as a means of quickly surveying what is available.

In general, the technology-rich organizations reported relying on a wider variety of sources than the technology-poor ones. More than half of the technology-rich organizations regularly consult popular computing magazines and/or professional publications. Only a fourth of the technology-poor organizations regularly consult professional publications, and less than 10% regularly consult popular computing magazines.

Since more of the technology-rich organizations have greater financial resources to continually add to their software collections, they have a greater need to be aware of the broad variety of software products available on the market.

Specific Sources Consulted

There was little agreement on which specific sources to consult. One reason for this may be that many professional publications and organizations are based locally or regionally. (For example, provider organizations in the Pacific Northwest rely on information from the Oregon/Washington Adult Basic Skills Technology Consortium, many organizations in California consult OTAN, and some Massachusetts organizations have joined the Boston Computer Society.) In addition, for some provider organizations, one particular student population is the primary focus and they seek information from student population-specific sources (e.g., TESOL for ESL; LVA for volunteer, tutor-based programs). Technology hardware differences is another reason for lack of consensus on information sources. For instance, organizations that use only Apple II and/or MS-DOS computers do not consult Macintosh-only publications.

Why Provider Organizations Consult the Sources They Do

Over 75% of the organizations (26 of 33) explained that they typically consult the information sources they do because they find the information reliable. Other frequent explanations include the fact these sources are readily available and provide sufficient detail. A third of the technology-experienced organizations indicated that they rely on sources because they provide evaluative information about software.

Why Provider Organizations Rarely or Never Consult Some Sources

More than 60% of the organizations rarely or never consult reviews from college- or university-based projects, reviews from online services, and educational technology software guides such as the Apple Access Guides (Apple Computer), the Oregon/Washington Adult Basic Skills Technology Consortium Software Buyers Guide, the Intellimation Library for the Macintosh catalogue (Intellimation, Inc.), and The Educational Software Selector (EPIE Institute). Over half of the organizations rarely or never consult the Guide to Recommended Literacy Software (Adult Literacy and Technology Project).

The most often-cited reason for rarely or never consulting an information source was lack of knowledge of that source (27 of 33). Other reasons mentioned include: sources not being readily available; sources being too expensive; sources providing insufficient detail; and sources taking up too much time.

WHAT ADULT LITERACY PROVIDER ORGANIZATIONS WANT TO KNOW ABOUT EDUCATIONAL SOFTWARE

When provider organizations were asked to identify issues they always consider when deciding on software purchases, approximately 90% of the respondents indicated that price is an essential issue. Frequently-identified issues are presented in Table 59 (below).

Table 59 -- Frequently-identified Essential Issues for Adult Literacy Software Purchase Decisionmakers (N=33)

Issue	Number of Organizations	Percent
Price	30	90.9%
Existence and quality of the user's manual	27	81.8%
Hardware compatibility	24	72.7%
Back-up copies provided	24	72.7%
Preview copies available	22	66.7%

Presumably, provider organizations must have access to information about these issues before they can complete the purchase process.

When asked to describe the ideal information source about educational software, over 80% of the organizations mentioned information about student population appropriateness. Frequently-mentioned data are summarized in Table 60 (page 69).

Table 60 -- Information Provider Organizations Frequently Seek in an Ideal Educational Software Information Source (N=33)

Information Sought	Number of Organizations	Percent
Student population appropriateness	28	84.9%
Evaluative judgments about the software (beyond the fact that it was or was not recommended)	23	69.7%
Description of the program	17	51.5%
Cost	15	45.5%

With respect to evaluative information, there is consensus among the adult literacy provider organizations that software evaluations should describe the product's good and bad points, and assess the seriousness of any problems. Most respondents (80% or more) agreed that evaluations should:

Discuss the instructional implications of the program's good and bad points

Offer tips to the teacher that will save time when actually using the program

Compare the software product under review with other similar products

Reflect field testing of the product with students

Field testing refers to informal testing to determine a software product's ease-of-use, the extent to which students can proceed without confusion, and its ability to motivate students, rather than formal pretesting and posttesting to measure learning outcomes.

When considering the information on software that provider organizations seek and do not seek from outside sources, it is important to keep in mind that many organizations include software previewing as part of the purchase decisionmaking process. It is not necessary that all the information come from outside sources.

OVERVIEW OF INFORMATION SOURCES ON ADULT LITERACY

As a conclusion to Chapter 3, we present an overview of the different kinds of information sources available on software for adult literacy. Issues discussed include:

* Information provided
* How the source is used
* Accessibility of the source

Word of Mouth

Word of mouth -- especially from adult education colleagues and educational technology experts -- is the most important source adult literacy provider organizations rely upon for information on software. Purchase decisionmakers regard word of mouth as reliable because only sources that withstand the test of time (i.e., whose recommendations prove to be valuable ones) are used again and again. Word-of-mouth sources have biases that are sometimes apparent and sometimes not. We suspect that each provider organization tends to rely on sources who share the organization's philosophy regarding adult education and use of technology.

Word-of-mouth sources vary in their level of expertise regarding software quality, in their specific knowledge of adult literacy sub-populations, and in their awareness of "what's out there." Some states and regions have agencies that serve as technology resource centers, and these provide excellent word-of-mouth sources. In some areas of the country, provider organizations must rely on local word-of-mouth sources. Technology conferences and show provide wide access to reliable word-of-mouth sources.

Word-of-mouth sources are used during the initial data-gather phase of the purchase decisionmaking process. Sometimes they are the only sources used before previewing software. Sometimes they are consulted as a check on published data sources.

Word-of-mouth sources are usually free or low cost to the provider organization, but some investigation time is necessary to find reliable sources. If expert word-of-mouth sources are made available to local provider organizations as needed, some agency must fund the effort -- be it federal or state government, or a regional or professional organization.

Software Catalogues

Publisher and distributor catalogues typically offer essential data about software programs and evaluative information that is biased in favor of the publisher. When catalogues are considered as a collection, they provide an excellent overview of "what's out there" and are reasonably up-to-date regarding new products. Some address the issue of adult appropriateness, but many do not.

The survey data suggest that technology-rich provider organizations rely on catalogues more than technology-poor organizations -- perhaps because they purchase more software on a regular basis and, therefore, keeping current is essential. Catalogues are used during the initial data-gather phase of the purchase decisionmaking process. Other sources are typically consulted as a check on catalogues' publisher biases.

Catalogues are free, but someone in the provider organization must bear responsibility for ordering new editions and for maintaining the catalogue collection.

Popular Computing Magazines

Popular computing magazines are some of the most up-to-date sources regarding new products and provide in-depth evaluations of general purpose productivity products. Some magazines also provide information on educational software that is not adult-specific but adult literacy appropriateness is not discussed. Some magazines are hardware specific.

Popular computing magazines are relied upon by over half the technology-rich provider organizations responding to our survey (10 of 17) but by few technology-poor organizations. This is probably due to the cost of subscriptions and because technology-poor organizations have less need to know about the latest software. Organizations with few instructional staff members are less likely to read these magazines because of time constraints.

Professional Publications

Adult literacy professional publications provide information on software that is often focused specifically on the needs of adult education and, in some cases, on specific sub-populations. Content expertise is typically great, whereas educational technology expertise can vary. Biases with respect to adult education philosophy and use of technology are often stated or apparent. Professional publications include journals, technology center newsletters and software preferred lists, and online bulletin boards.

Professional publications vary in cost, depending on the medium (e.g., glossy journal vs. photocopied newsletter), the source of the publication, and whether the provider organization is a member of the professional organization sponsoring the publication.

State and Regional Education Agencies

The survey data suggest that if a state or region has an agency that provides information on technology for adult literacy, most computer-using provider organizations in that state or region will take advantage of its services. (In some areas of the country, a public college may serve as the central agency for the state or region.) These sources are especially well-matched to the needs of provider organizations because they combine subject matter and technology expertise.

State and regional agencies often serve as word-of-mouth sources, and as sources of newsletters and software preferred lists. Some also provide online, telecommunications-based support. Such agencies are consulted during the initial phase of the software decisionmaking process and sometimes later on, as well.

State and regional agencies are usually free or low cost to the provider organization, but there must be a source of funding for the agency itself (e.g., federal or state government, or a regional or professional organization).

Software Guides

Independently-published software guides and directories provide a broad overview of "what's out there" and, in some instances, general information as to adult appropriateness.

Software guides vary in their criteria for including software products. Adult literacy-specific guides typically have standards for adult appropriateness, but they vary as to standards for software quality and evaluator expertise. Keeping some guides up to date is a problem because they are published less frequently than every year, or on an ad hoc basis.

Few provider organizations we surveyed used software guides or directories on a regular basis. In general, organizations only used a software guide if they had knowledge of and respect for the institution publishing the guide.

Some guides are free to provider organizations in a specified area of the country or to member organizations (if published by a professional society). Most others are available at relatively low cost.

CHAPTER 4

POLICY RECOMMENDATIONS: COMPUTER-BASED TECHNOLOGY AND SOFTWARE FOR ADULT LITERACY

OVERVIEW

This chapter reviews the results of adult literacy provider organizations' suggestions for government funding in the area of technology and software for adult literacy. These suggestions were in response to questions from a written survey and follow-up interviews (discussed in detail in Chapter 2, beginning on page 18).

Based on this review and the other data presented in Chapters 1 through 3, we offer several recommendations for federal policy regarding computer-based technology and software for adult literacy.

GOVERNMENT FUNDING TO IMPROVE THE USE OF TECHNOLOGY IN ADULT EDUCATION: SUGGESTIONS FROM PROVIDER ORGANIZATIONS

The provider organizations were asked to identify from a list of choices the two best uses of federal, state, and local government funds to advance the use of technology in adult education. There was little consensus among provider organizations. The most frequently-identified uses are summarized in Table 61 (page 74).

Table 61 -- Most Frequently-identified Uses for Government Funding to Advance the Use of Technology in Adult Education (N=33)

Use for Funding	Number of Organizations	Percent
Fund purchase of computers and peripherals	19	57.6%
Fund development of adult literacy-specific software	16	48.5%
Fund purchase of software	14	42.4%
Fund informational support	14	42.4%

There was little difference between technology-rich and technology-poor organizations in the desire for funding for hardware purchases, suggesting a need "across the board," as indicated by the following paraphrases of respondent comments:

> Funds that are currently available are insufficient.
>
> High technology adult literacy sites currently depend on foundation and industry support.
>
> Research is useless without funds for hardware.
>
> Difficult to obtain money for hardware.

The relatively high support for development of adult literacy-specific software seems noteworthy, since funding for software development represents a delayed benefit to provider organizations (i.e., they have to wait for products to come to market and hope they can afford them) as compared to the immediate benefit of funds for software purchase. Even among technology-poor organizations, the support for funding of development of adult literacy-specific software was even with support for funding for software purchase. Typical respondent comments include the following.

> "Need software appropriate for adults"
>
> "[Need] more software...in the pipeline"

Funding of information support refers to funding of educational technology research, research dissemination, dissemination of software evaluations, sharing of promising instructional practices that incorporate technology, and staff development. None of these was identified as a high priority, by itself, by more than 5 respondents. While only 5 respondents indicated that staff development was a high priority, staff development was not one of the listed choices on the survey form. Thus, selection of this option represented a "write-in" vote. We suspect that staff development is a higher priority than is indicated here. Respondent comments concerning staff development follow.

"[Need] effective training for strategies to utilize existing hardware and software already in place."

"Unfortunately...most...administrators see the hardware and software as the final step. They seem to forget that teachers do not 'automatically' know how to use the hardware or the software. It is estimated that one should plan to spend at least 1/2 of the cost of hardware and software on teacher training....if training were available from the beginning, it would save time and energy since 'trial and error' is a non-productive activity."

"Please keep in mind that, as you are able to influence Congressional funding, we need money earmarked for teacher and staff training on the technology that is in place....it is training to use the technology that is lacking. We cannot continue to rely on the generosity of teachers with their time to learn all that is necessary for them to learn now as well as what will be required of them...in the future."

RECOMMENDATIONS FOR FEDERAL POLICY REGARDING TECHNOLOGY AND SOFTWARE FOR ADULT LITERACY

1. The federal government should consider mechanisms for *funding technology hardware on an on-going basis*. We estimate that the current student-to-computer ratio for the typical technology-rich adult literacy provider organization is approximately 5:1 and that the ratio for the typical technology-poor organization may exceed 15:1 -- too high for incorporating technology as a regular, integral part of the learning process. Funding of more computers will also likely stimulate commercial development of software products for the adult literacy market. Provider organizations with the highest student-to-computer ratios should be targeted for special assistance. Many community-based organizations are particularly in need of help.

Increased access to technology hardware is no guarantor of its long-term effective use for educational benefit. To help ensure that government funding of technology hardware is money well spent, adult literacy organizations applying for such funding should be required to present a written plan detailing:

* A general philosophy for the use of technology
* An overall plan for integrating technology into the curriculum
* The provider organization's commitment to the use of technology, in terms of staffing, time, and other resources
* A plan for maintaining the effective use of technology beyond initial implementation[34]

Furthermore, there should be an ongoing reporting requirement to document that provider organization commitments are met.

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[34] These planning requirements were suggested by Inaam Mansoor, in correspondence to the U.S. Congress Office of Technology Assessment, Apr. 22, 1992.

A funding plan should take into consideration the problem of technology hardware's rapid obsolescence. Today's hardware purchases will not take advantage of tomorrow's technological breakthroughs; yesterday's purchases begin to look like museum artifacts. Leasing rather than purchasing of equipment is one possible solution, but this requires that funding be ongoing.

Special tax incentives for corporate "recycling" of older computers to adult literacy provider organizations are also worth exploring. (Since the educational community tends to lag behind the corporate community in adoption of the latest technology standards, recycled hardware is still likely to be of value to most provider organizations.)

A sound federal plan for long-term funding of technology hardware should provide for equipment maintenance as well, since too few provider organizations have adequate hardware maintenance budgets.

2. Consider partial *funding of adult-specific software development* for targeted subjects, content topics, and student sub-populations that the existing software market is unlikely to satisfy on its own (e.g., products for non-readers, low-level readers, and ESL). (For a summary of subjects and topics underserved by the available software supply, see **Software in Specific Subjects**, beginning on page 61.) More adult literacy provider organizations consider adult-appropriateness when purchasing software than any other characteristic. Despite this, too few of the educational software products available on the market have been specifically designed with adult learners in mind.

The software development process means much more than programming. Since content and methodological appropriateness are key for adult education software products, consider focusing government support on adult-oriented technology-based content development and instructional design, in coordination with institutions of higher learning that have expertise in these areas. Support for software engineering and programming should be limited to products that take advantage of new technologies (e.g., Apple Computer's speech recognition technology that does not require "training" the program to understand a particular user's speech patterns).

3. Fund the purchase of select adult literacy-specific software products that:

* Address the needs of sub-populations not well met by the current software market (see **Software in Specific Subjects**, beginning on page 61)

* Cost more than most provider organizations can afford

* Have been independently tested to result in improved learning outcomes or faster rates of learning than traditional methods of instruction

Compared to the general education market, the adult literacy software market is small and poor. While demand for adult-specific products is potentially high, funds for software purchases are in short supply for many adult literacy provider organizations. It cannot be assumed that the commercial software market will meet the needs of these organizations without governmental assistance.

4. *Fund staff development related to integrating technology into the curriculum.* If we expect adult literacy providers to deliver quality instruction that takes fullest advantage of technology, then adult educators must receive adequate and on-going training and support. The differences noted in this report between technology-experienced and

technology-novice provider organizations strongly suggest that many technology-novices are in great need of additional staff development related to technology. Interestingly, it is some of the technologically richest and most experienced organizations that recognize the importance of on-going staff development.

Besides the cost of the training itself, there is the cost of the time teachers and administrators must spend in staff development. For full-time instructional staff, funding should cover the costs of release time. Part-time staff members should be paid for their involvement in staff development -- over and above their compensation for direct contact with students.

5. Consider *adding funding to the Adult Education Act's (AEA) formula grants for state and/or regional literacy resource centers so that they serve as resources for educational technology* as well. Purposes should include: dissemination of research, promising practices, and information about appropriate software; staff development; organizing regional conferences; providing ongoing telephone, computer-based telecommunication, and on-site technology-related support to local provider organizations; providing preview centers with vast software libraries, including software requiring hardware that many provider organizations do not yet possess; and making hardware facilities available for adult literacy technology researchers.

Wherever possible, existing institutions that currently serve as state or regional adult literacy technology resource centers should be funded as the educational technology "branches" of AEA literacy resource centers. For example, the Outreach and Technical Assistance Network (OTAN) in California and the Adult Success Center at Idaho State University already serve as essential adult literacy technology information resources in their respective states. Funding as AEA centers would help them expand their work and would be far more cost-effective than starting new resource centers from scratch. New centers should only be developed where none yet exist.

6. Consider including the following educational technology-related functions to the goals of the newly established National Institute for Literacy.

* Compile and continually update information on software effectively used by adult literacy provider organizations throughout the country, research on technology and adult education, and model adult literacy programs that incorporate technology; disseminate this information via the state and/or regional literacy resource centers discussed in Recommendation 3 above.

* Fund studies such as this report but focused on provider organizations for specific sub-populations and including enough provider organizations for statistical reliability.

* Fund the development of a universal competency-based materials database (including software and print-based materials) that is correlated to all commonly-used adult literacy competency exams (e.g., TABE, CASAS). Make this database available for use by any educational materials publisher, software publisher, instructional systems vendor, and adult literacy provider organization.

* Fund demonstration projects that shed light on effective uses of educational technology, including: documenting the process of initiating and maintaining technology-based instruction at adult learning centers; developing models for integrating technology into the curriculum; testing standards for computer/teacher and student/computer ratios; establishing guidelines for staff development; developing and testing methods and materials for effective educational use of productivity products and newer technologies[35]. In some instances, the state and/or regional AEA technology resource centers described in Recommendation 5 might be the recipient of demonstration grants. In other cases, a local provider organization might receive a demonstration grant and would work in cooperation with the nearest AEA technology center.

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35 Originally suggested by Inaam Mansoor, in correspondence to the U.S. Congress Office of Technology Assessment, Apr. 22, 1992.

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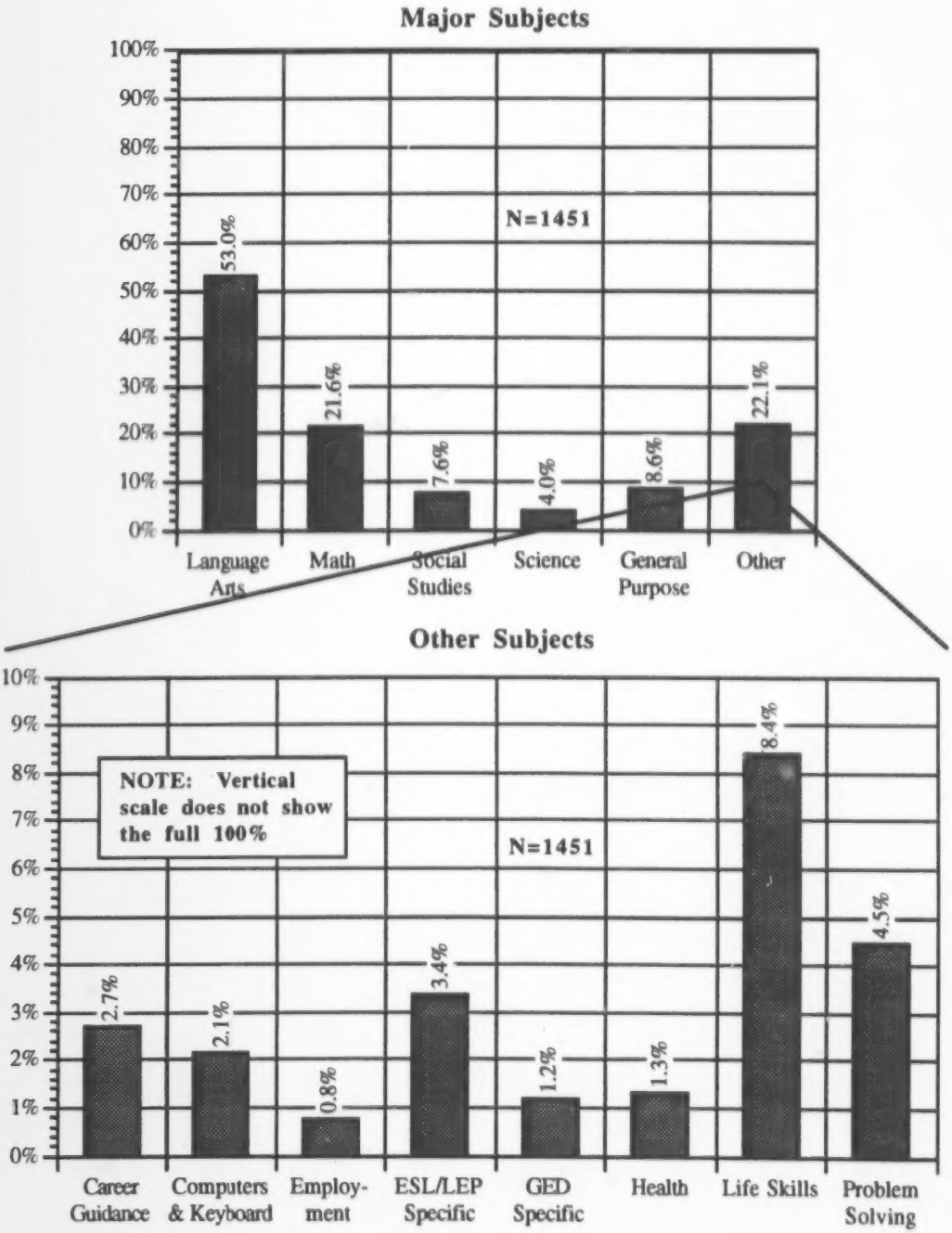
APPENDIX I

SCOPE OF THE CURRENT SUPPLY OF ADULT LITERACY SOFTWARE: FIGURES AND TABLES

Figure 1. — Distribution of Products by Subject *



* The sum of all percentages is greater than 100% because some products address more than one subject.

Figure 2. — Distribution of Language Arts Products *

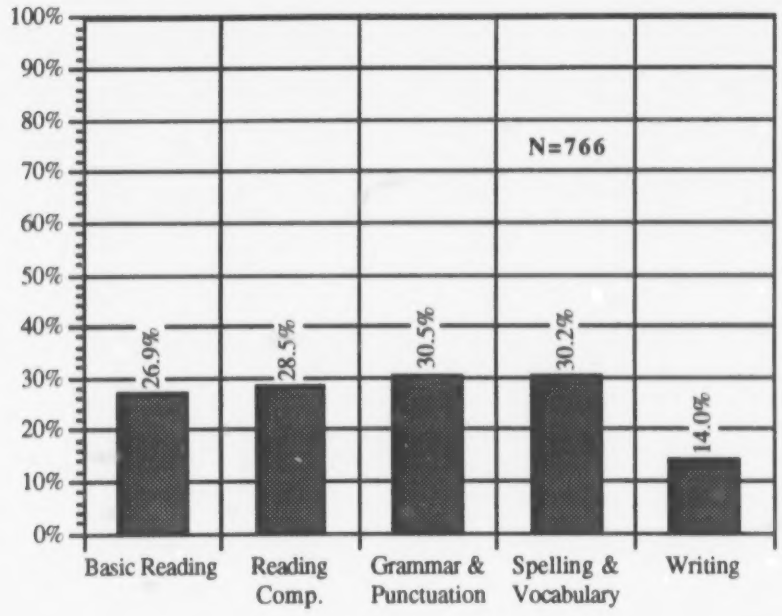
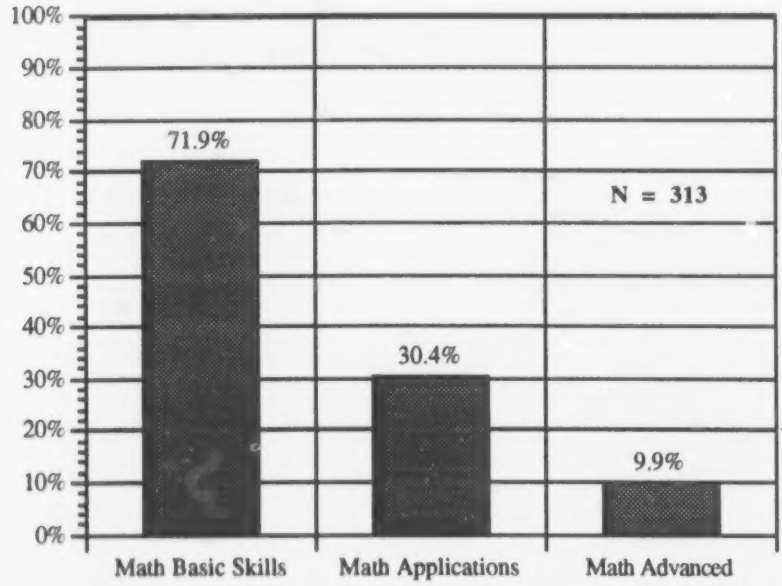


Figure 3. — Distribution of Math Products *



* The sum of all percentages is greater than 100% because some products address more than one subject.

Table 1. — Distribution of Products by Subject *
N=1451

Major Subjects	Number	Percent
Language Arts	769	53.0%
Math	313	21.6%
Social Studies	111	7.6%
Science	58	4.0%
General Purpose	126	8.6%
Other	321	22.1%

Other Subjects	Number	Percent
Career Guidance	39	2.7%
Computers & Keyboard	31	2.1%
Employment	11	0.8%
ESL/LEP Specific	49	3.4%
GED Specific	17	1.2%
Health	19	1.3%
Life Skills	122	8.4%
Problem Solving	65	4.5%

Table 2. — Distribution of Language Arts Products *
N=766

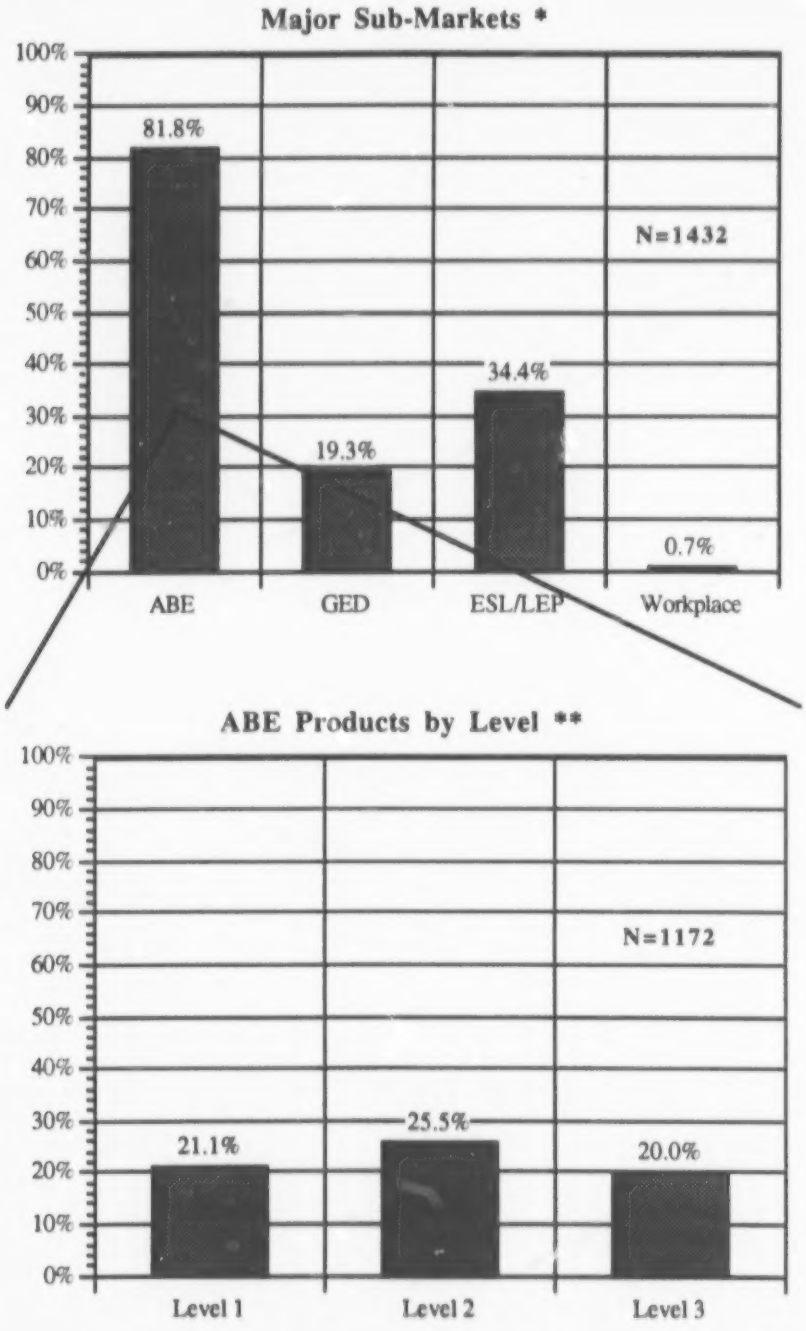
Language Arts Topics	Number	Percent
Basic Reading	206	26.9%
Reading Comp.	218	28.5%
Grammar & Punctuation	234	30.5%
Spelling & Vocabulary	231	30.2%
Writing	107	14.0%

Table 3. — Distribution of Math Products *
N=313

Math Topics	Number	Percent
Math Basic Skills	225	71.9%
Math Applications	95	30.4%
Math Advanced	31	9.9%

* The sum of all percentages is greater than 100% because some products address more than one subject.

Figure 4. — Distribution of Products by Sub-Market *



* The sum of all percentages is greater than 100% because some products have been judged appropriate for more than one sub-market.

** The sum of percentages for ABE levels 1-3 is less than the total percentage for ABE because some products judged appropriate for ABE were not assigned specific levels.

Table 4. — Distribution of Products by Sub-Market *

Major Sub-Market * N=1432	Number	Percent
ABE	1172	81.8%
GED	277	19.3%
ESL/LEP	492	34.4%
Workplace	10	0.7%

Products by Level ** N=1172	Number	Percent
Level 1	247	21.1%
Level 2	299	25.5%
Level 3	234	20.0%

* The sum of all percentages is greater than 100% because some products have been judged appropriate for more than one sub-market.

** The sum of percentages for ABE levels 1-3 is less than the total percentage for ABE because some products judged appropriate for ABE were not assigned specific levels.

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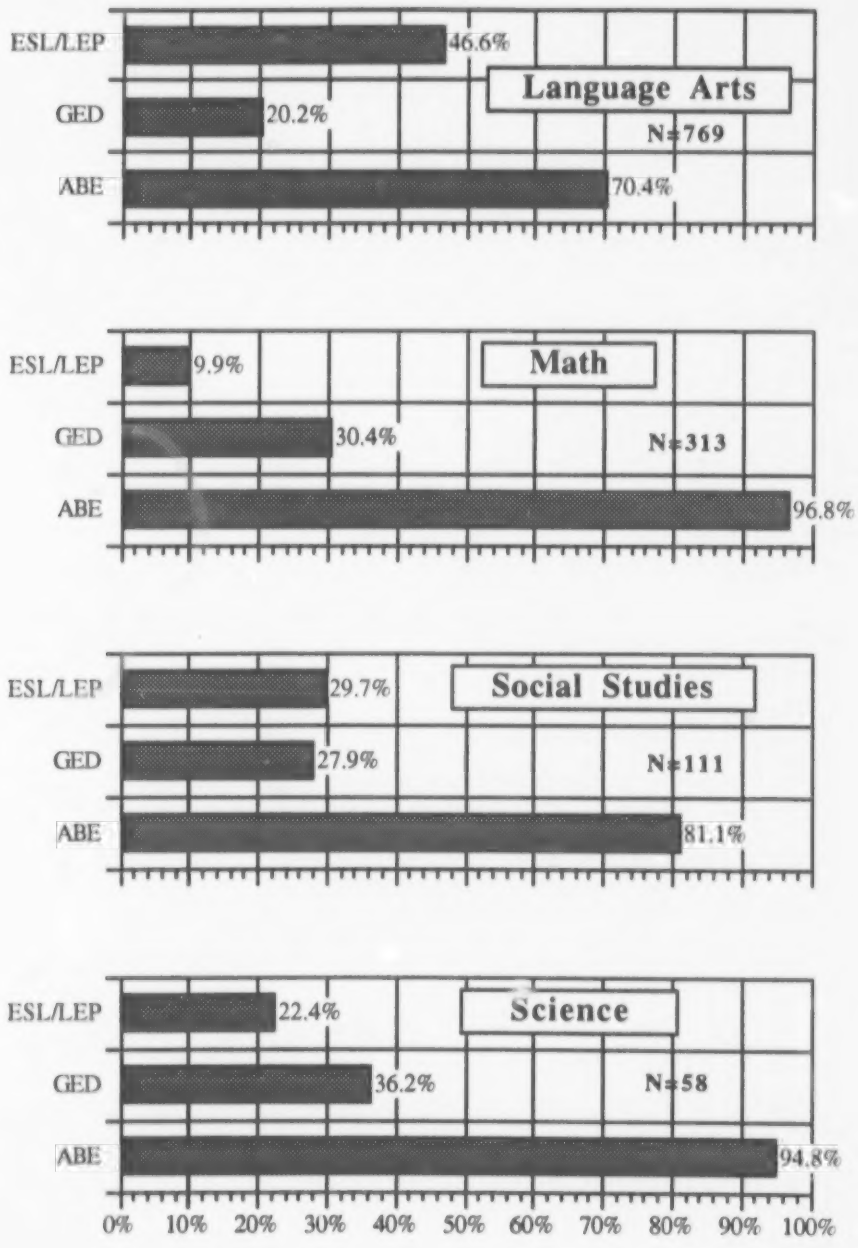
Figure 5.— Major Sub-Market Distribution by Major Subject *



* Within each subject, the sum of all percentages is greater than 100% because some products have been judged appropriate for more than one sub-market.

Figure 5.— Major Sub-Market Distribution by Major Subject *
(Continued)

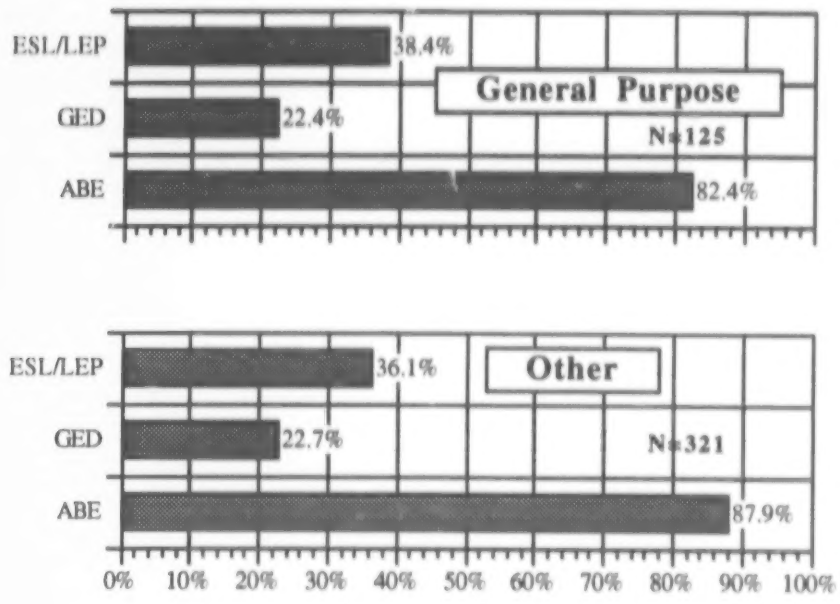


Table 5. — Major Sub-Market Distribution by Major Subject *
N=1432

Sub-Market	Language Arts		Math		Social Studies		Science		General Purpose		Other	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
ABE	560	70.4	303	96.8	90	81.1	55	94.8	103	82.4	282	87.9
GED	161	20.9	95	30.4	31	27.9	21	36.2	28	22.4	73	22.7
ESL	371	48.2	31	9.9	33	29.7	13	22.4	48	38.4	116	36.1

* Within each subject, the sum of all percentages is greater than 100% because some products have been judged appropriate for more than one sub-market.

90

Figure 6. — Subject Distribution by Major Sub-Market *

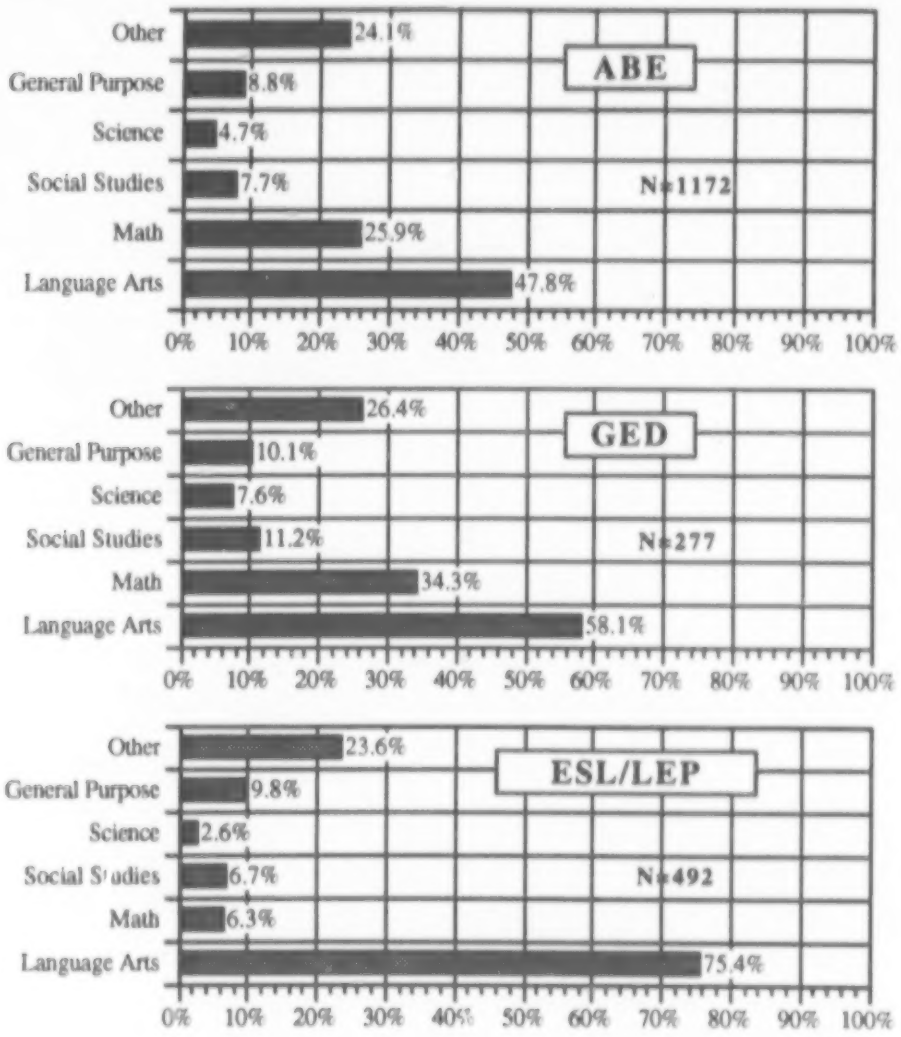


Table 6. — Subject Distribution by Major Sub-Market *
N=1451

Subjects	ABE		GED		ESL/LEP	
	Number	Percent	Number	Percent	Number	Percent
Language Arts	560	47.8%	161	58.1%	371	75.4%
Math	303	25.9%	95	34.3%	31	6.3%
Social Studies	90	7.7%	31	11.2%	33	6.7%
Science	55	4.7%	21	7.6%	13	2.6%
General Purpose	99	8.8%	28	10.1%	48	9.8%
Other	282	24.1%	73	26.4%	116	23.6%

* Within each sub-market, the sum of all percentages is greater than 100% because some products address more than one subject.

Figure 7. — Instructional vs. Productivity Products

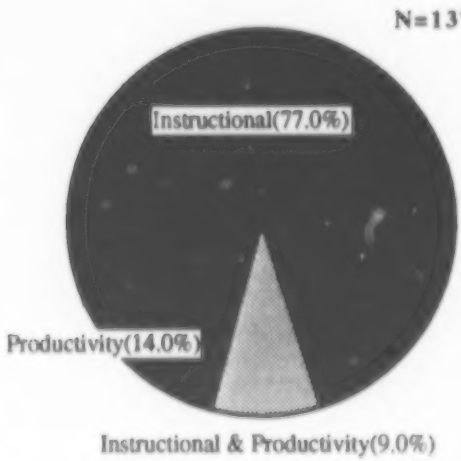


Table 7. — Instructional vs. Productivity Products
N=1373

Proportion	Number	Percent
Instructional	1057	77.0%
Instructional & Productivity	123	9.0%
Productivity	192	14.0%

Figure 8. — Distribution of Instructional Products by Type *

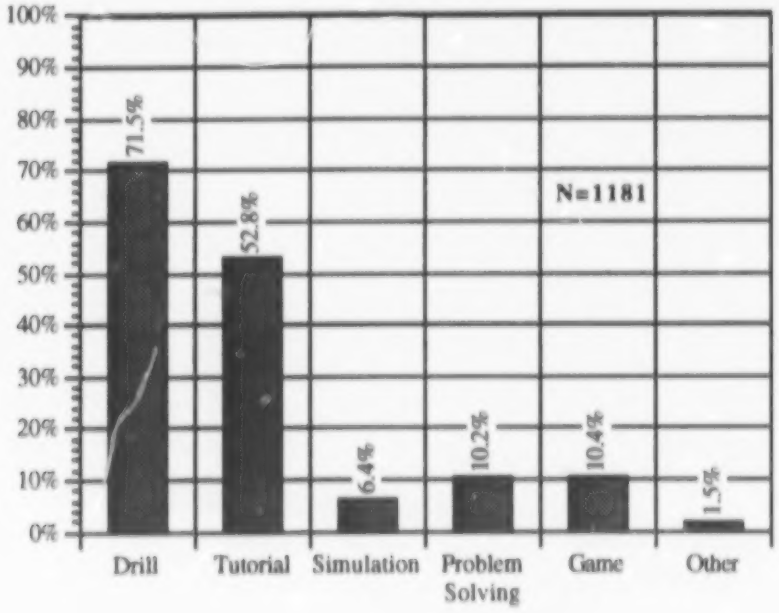
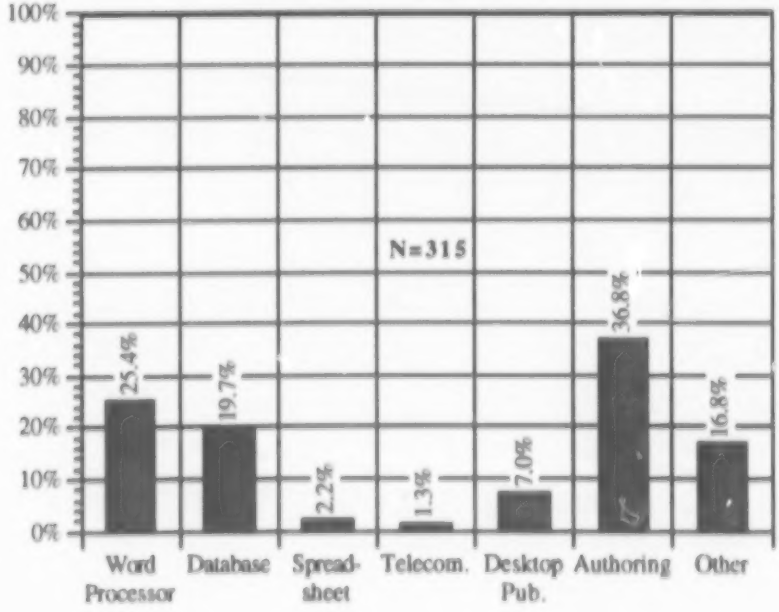


Figure 9. — Distribution of Productivity Products by Type *



* In each distribution, the sum of all percentages is greater than 100% because some products have been assigned more than one type category.

Table 8. — Distribution of Instructional Products by Type *
N=1181

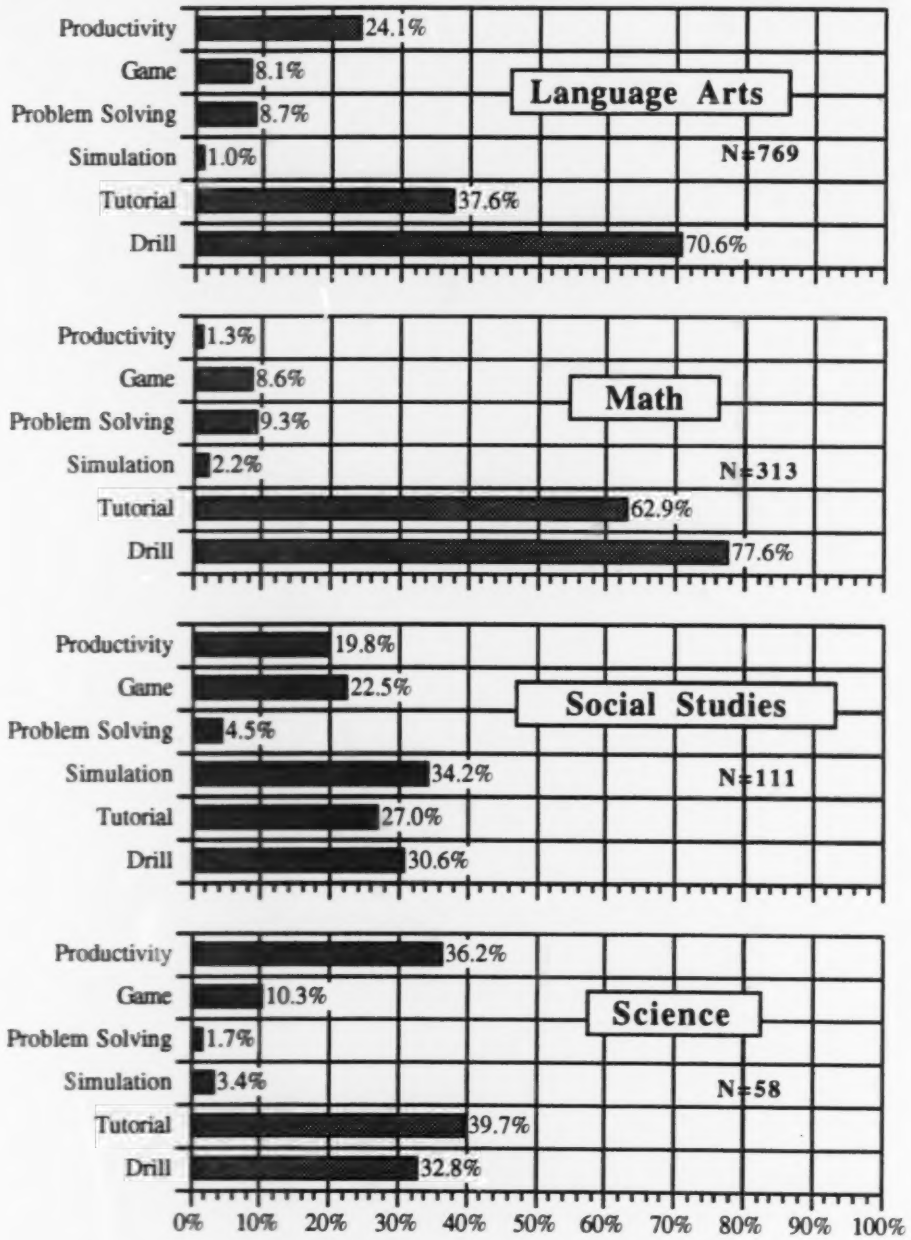
Types	Number	Percent
Drill	845	71.5%
Tutorial	624	52.8%
Simulation	75	6.4%
Problem Solving	121	10.2%
Game	123	10.4%
Other	18	1.5%

Table 9. — Distribution of Productivity Products by Type *
N=315

Productivity	Number	Percent
Word Processor	80	25.4%
Database	62	19.7%
Spread- sheet	7	2.2%
Telecom.	4	1.3%
Desktop Pub.	22	7.0%
Authoring	116	36.8%
Other	53	16.8%

* In each distribution, the sum of all percentages is greater than 100% because some products have been assigned more than one type category.

Figure 10. — Distribution of Software Type by Subject *



* In each distribution, the sum of all percentages is greater than 100% because some products have been assigned more than one type category.

Figure 10. — Distribution of Software Type by Subject *
(Continued)

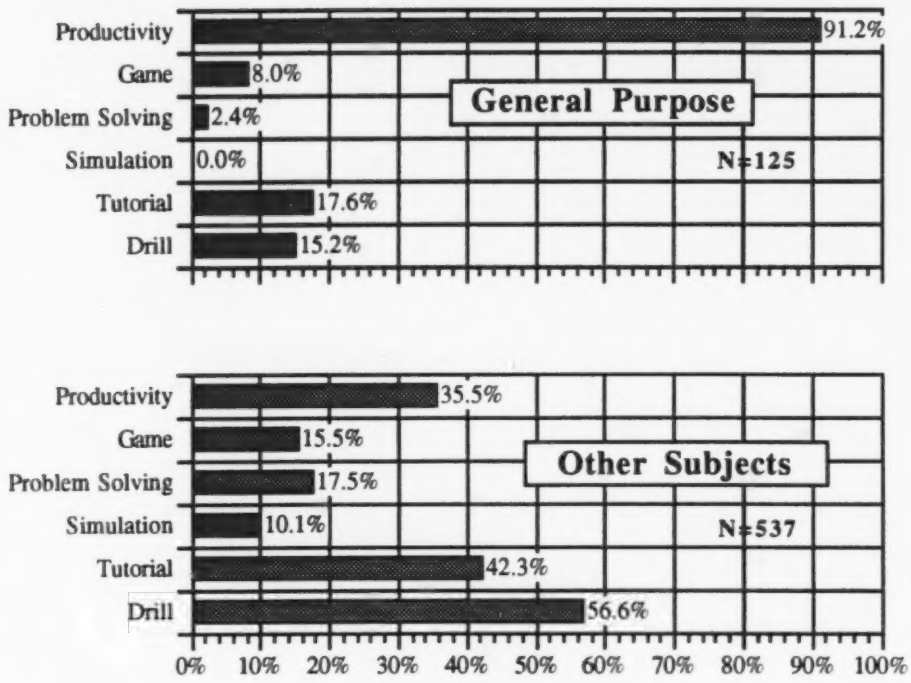


Table 10. — Distribution of Software Type by Subject *

Type	Language Arts		Math		Social Studies		Science		General Purpose		Other	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Drill	541	70.6	243	77.6	34	30.6	19	32.8	19	15.2	304	56.6
Tutorial	288	37.6	197	62.9	30	27.0	23	39.7	22	17.6	227	42.3
Simulation	8	1.0	7	2.2	38	34.2	2	3.4	0	0.0	54	10.1
Problem Slv.	67	8.7	29	9.3	5	4.5	1	1.7	3	2.4	94	17.5
Game	62	8.1	27	8.6	25	22.5	6	10.3	10	8.0	83	15.5
Productivity	185	24.1	4	1.3	22	19.8	21	36.2	114	91.2	114	35.5

* In each distribution, the sum of all percentages is greater than 100% because some products have been assigned more than one type category.

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Figure 11. — Distribution of Software Type by Sub-Market *

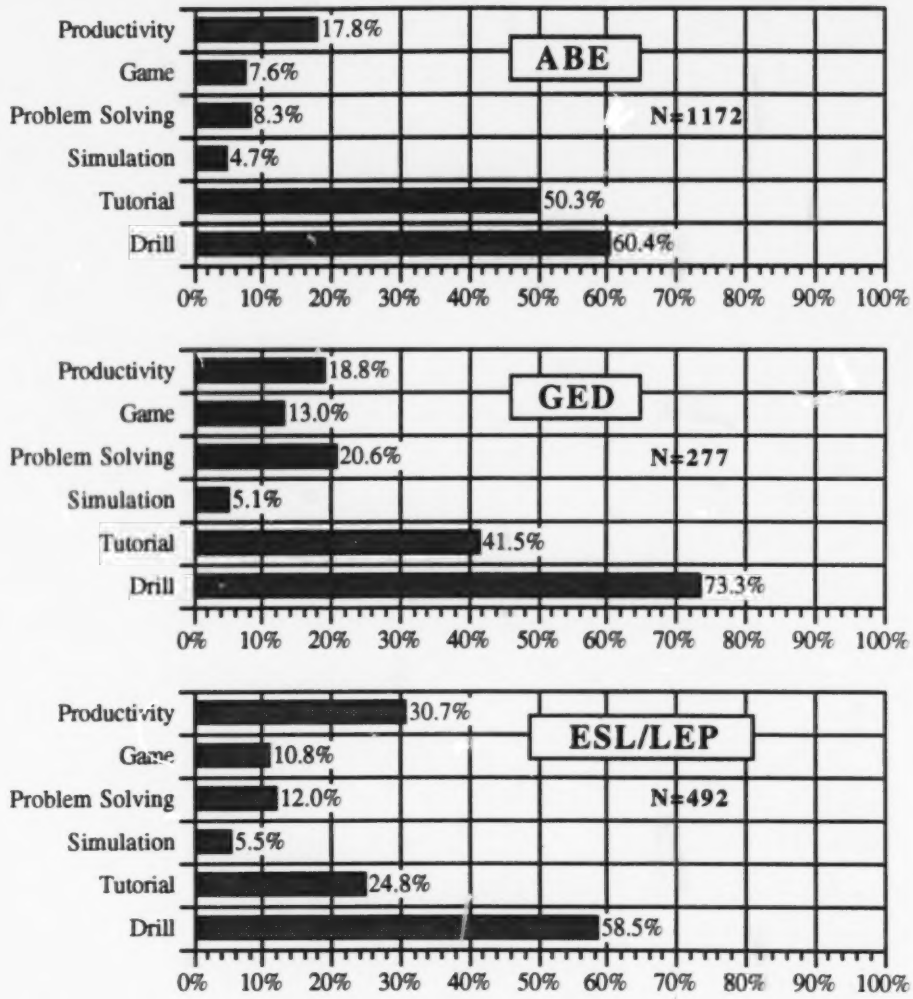


Table 11. — Distribution of Software Type by Sub-Market *

Type	ABE		GED		ESL/LEP	
	No.	%	No.	%	No.	%
Drill	708	60.4%	203	73.3%	288	58.5%
Tutorial	589	50.3%	115	41.5%	122	24.8%
Simulation	55	4.7%	14	5.1%	27	5.5%
Problem Solving	97	8.3%	57	20.6%	59	12.0%
Game	89	7.6%	36	13.0%	53	10.8%
Productivity	209	17.8%	52	18.8%	151	30.7%

* In each distribution, the sum of all percentages is greater than 100% because some products have been assigned more than one type category.

Figure 12. — Distribution of Products by Price

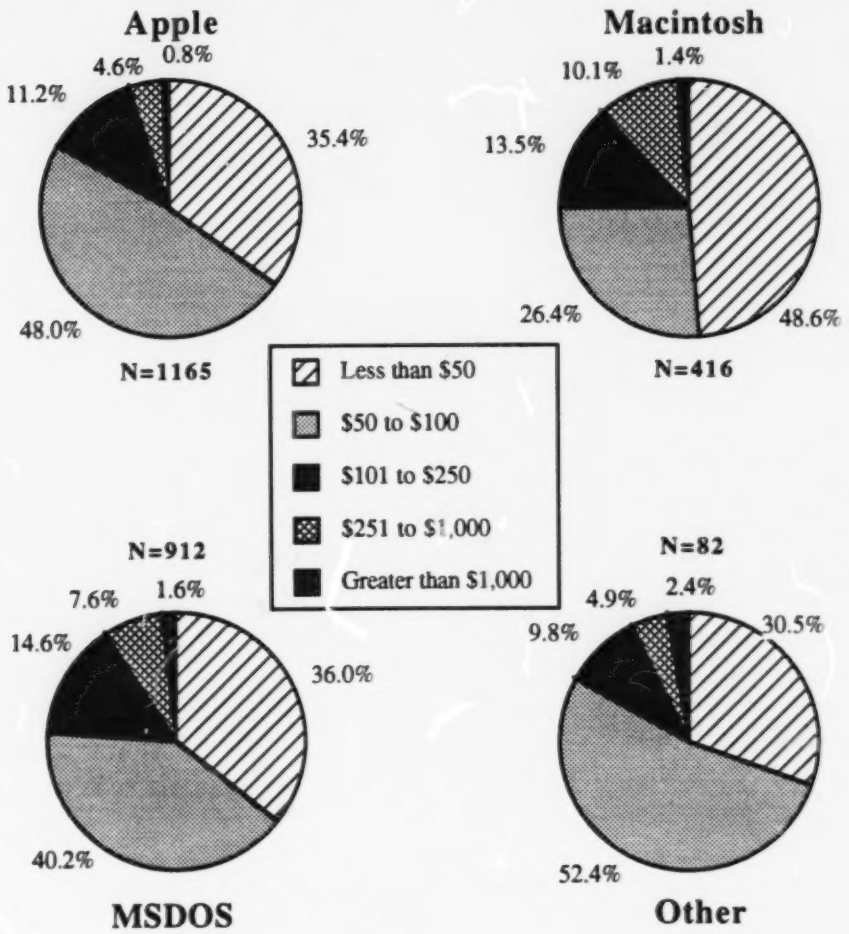


Table 12. — Distribution of Products by Price

Price Range	Apple N=1165		Macintosh N=416		MSDOS N=912		Other N=82	
	No.	%	No.	%	No.	%	No.	%
Less than $50	412	35.4	202	48.6	328	36.0	25	30.5
$50 to $100	559	48.0	110	26.4	367	40.2	43	52.4
$101 to $250	131	11.2	56	13.5	133	14.6	8	9.8
$251 to $1,000	54	4.6	42	10.1	69	7.6	4	4.9
Greater than $1,000	9	0.8	6	1.4	15	1.6	2	2.4

Figure 13. — Distribution of Products by Price for each Major Sub-Markets

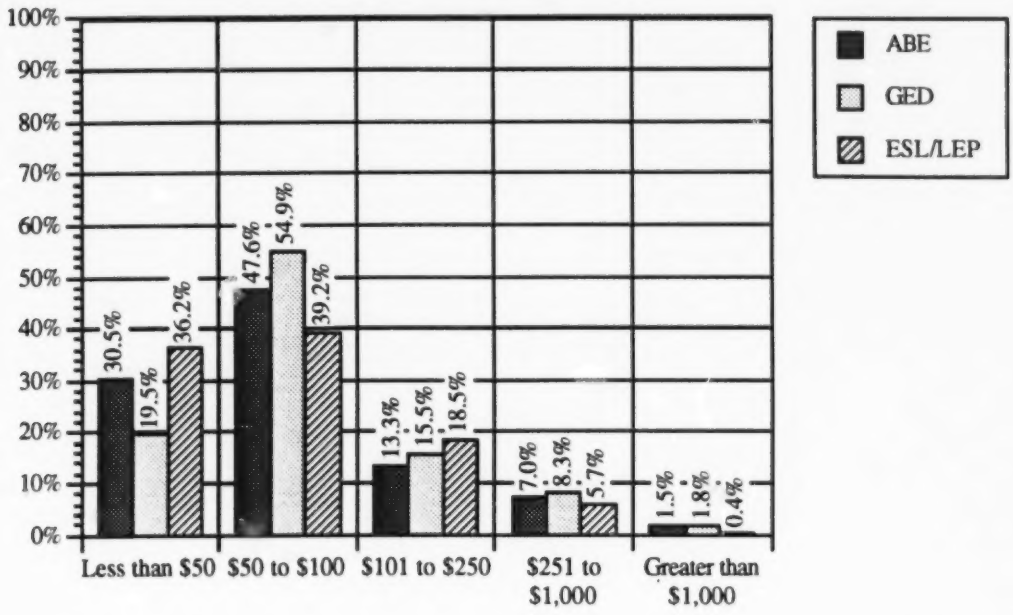


Table 13. — Distribution of Products by Price for each Major Sub-Markets

Price Range	ABE N=1163		GED N=277		ESL/LEP N=459	
	No.	%	No.	%	No.	%
Less than $50	355	30.5	54	19.5	166	36.2
$50 to $100	554	47.6	152	54.9	180	39.2
$101 to $250	155	13.3	43	15.5	85	18.5
$251 to $1,000	81	7.0	23	8.3	26	5.7
Greater than $1,000	18	1.5	5	1.8	2	0.4

Figure 14. — Distribution of Products by Computer Brand *

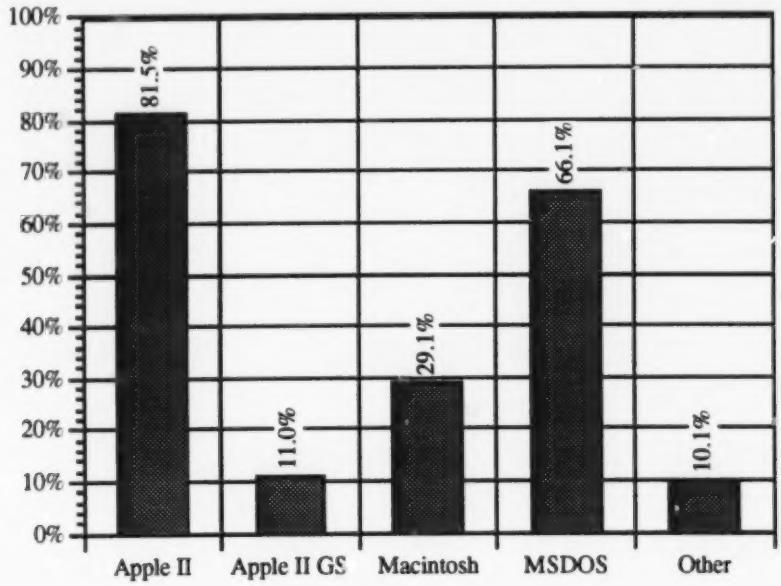
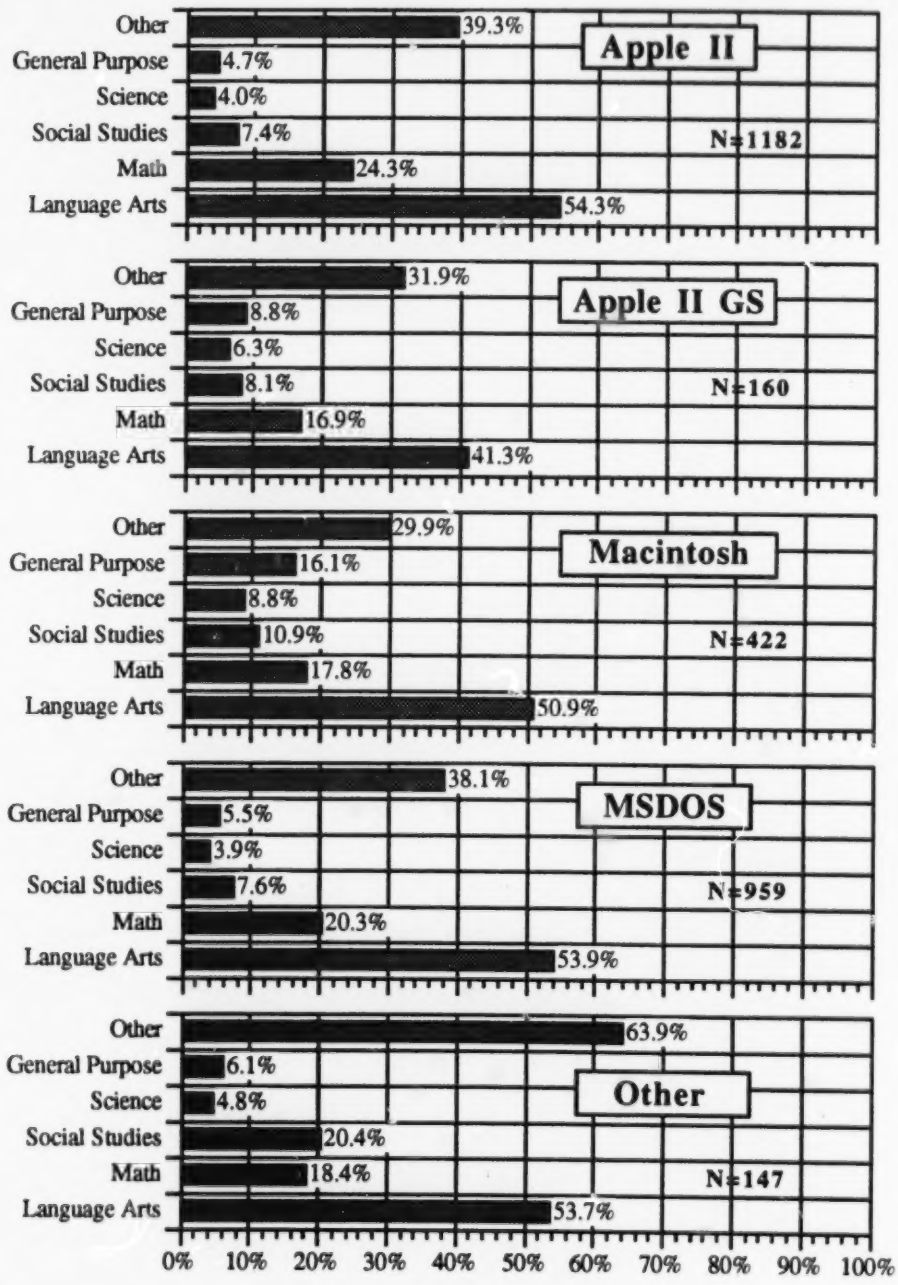


Table 14. — Distribution of Products by Computer Brand *
N=1451

Platform	Number	Percent
Apple II	1182	81.5%
Apple II GS	160	11.0%
Macintosh	422	29.1%
MSDOS	959	66.1%
Other	147	10.1%

* The sum of all percentages is greater than 100% because some products are available for more than one computer brand.

Figure 15. — Distribution of Subjects by Computer Brand *



* In each distribution, the sum of all percentages is greater than 100% because some products address more than one subject.

Table 15. — Distribution of Subjects by Computer Brand *

	Apple II N=1182		Apple II GS N=160		Macintosh N=422		MSDOS N=959		Others N=147	
Subject	No.	%	No.	%	No.	%	No.	%	No.	%
Language Arts	642	54.3	66	41.3	215	50.9	517	53.9	79	53.7
Math	287	24.3	27	16.9	75	17.8	195	20.3	27	18.4
Social Studies	88	7.4	13	8.1	46	10.9	73	7.6	30	20.4
Science	47	4.0	10	6.3	37	8.8	37	3.9	7	4.8
General Purpose	55	4.7	14	8 8	68	16.1	53	5.5	9	6.1
Other	465	39.3	51	31.9	126	29.9	365	38.1	94	63.9

* In each distribution, the sum of all percentages is greater than 100% because some products address more than one subject.

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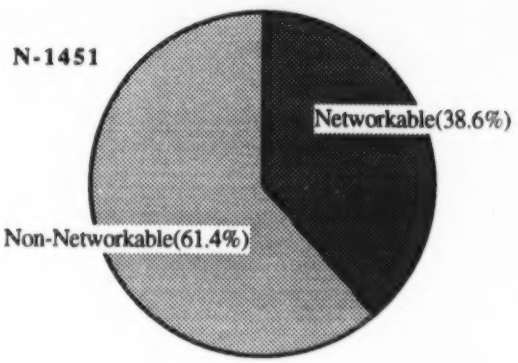
Figure 16. — Networkable vs. Non-Networkable Products



Of the 1451 listed in the database, 561 products (38.6%) were known to be networkable.

Figure 17. — Percentage of Products Requiring Additional RAM by Computer Brand

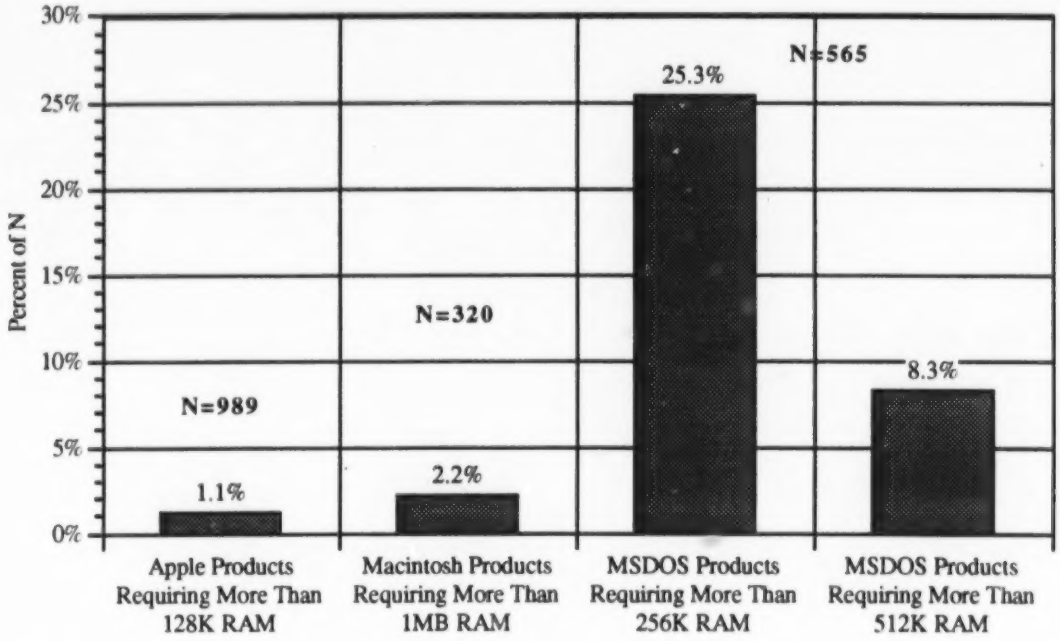


Table 16. — Products Requiring Additional RAM by Computer Brand

Criteria	No. Requiring Added RAM	Total Number of Products	Percent
Apple Products Requiring More Than 128K RAM	11	989	1.1%
Macintosh Products Requiring More Than 1MB RAM	7	320	2.2%
MSDOS Products Requiring More Than 256K RAM	143	565	25.3%
MSDOS Products Requiring More Than 512K RAM	47	565	8.3%

Figure 18. — Distribution of Additional Required Peripherals*

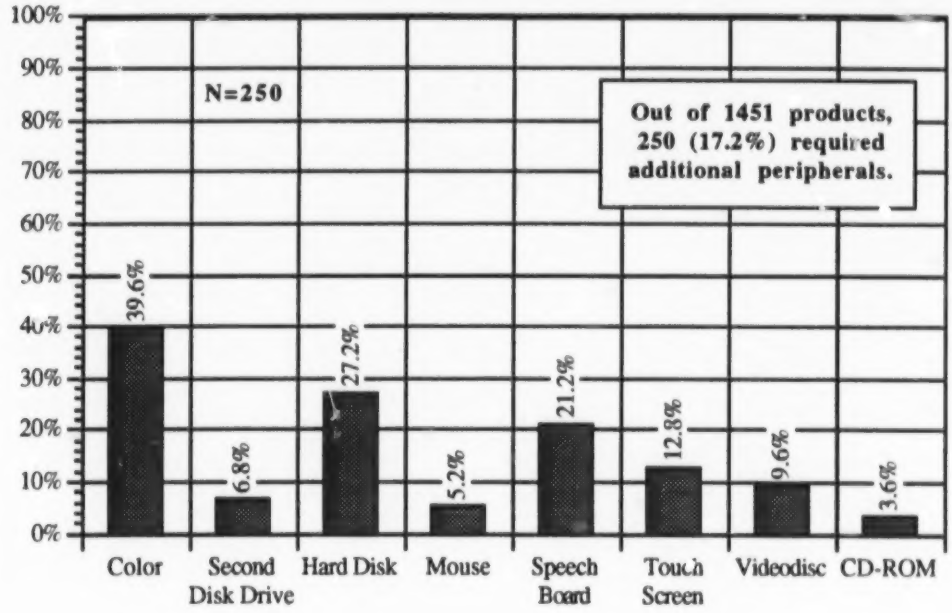
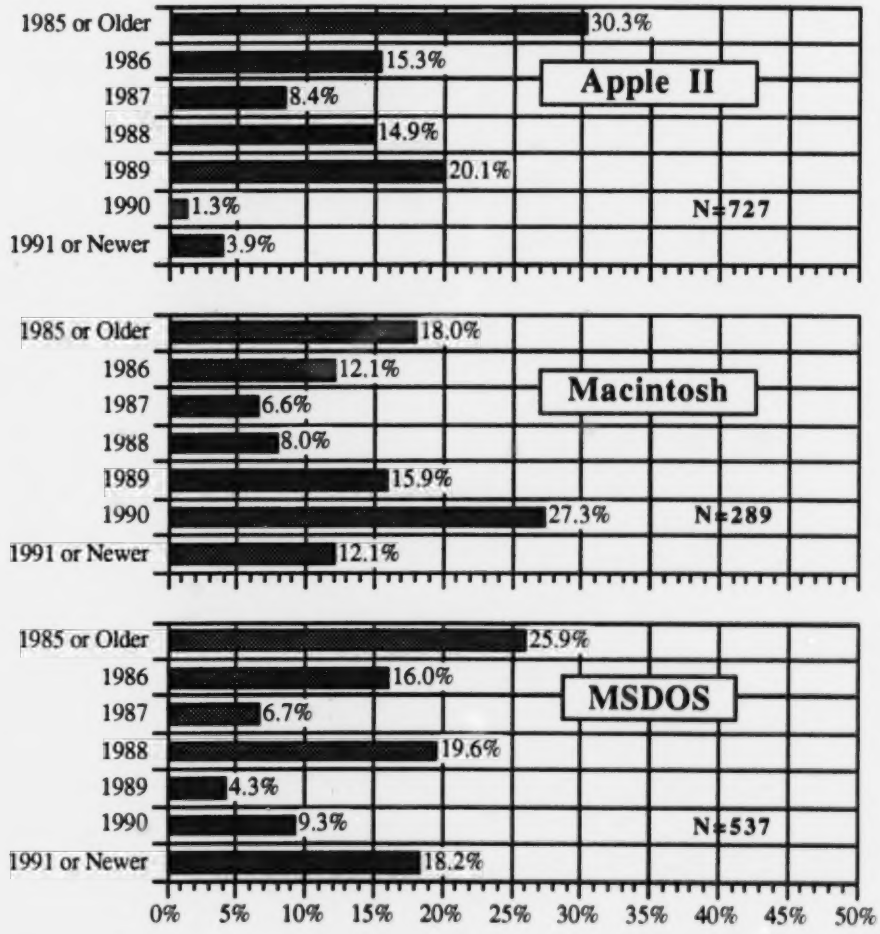


Table 17. — Distribution of Products Requiring Additional Peripherals*
N=250

Peripherals	Number	Percent
Color	99	39.6%
Second Disk Drive	17	6.8%
Hard Disk	68	27.2%
Mouse	13	5.2%
Speech Board	53	21.2%
Touch Screen	32	12.8%
Videodisc	24	9.6%
CD-ROM	9	3.6%

* The sum of all percentages is greater than 100% because some products require more than one additional peripheral.

Figure 19. — Distribution of Products by Copyright Date



NOTE: The horizontal scale of the tables above does not display the full 100%.

Table 18. — Distribution of Programs by Copyright Date

Copyright	Apple II N=772		Macintosh N=289		MSDOS N=537	
	No.	%	No.	%	No.	%
1985 or Older	234	30.3%	52	18.0%	139	25.9%
1986	118	15.3%	35	12.1%	86	16.0%
1987	65	8.4%	19	6.6%	36	6.7%
1988	115	14.9%	23	8.0%	105	19.6%
1989	155	20.1%	46	15.9%	23	4.3%
1990	10	1.3%	79	27.3%	50	9.3%
1991 or Newer	30	3.9%	35	12.1%	98	18.2%

APPENDIX II

PARTICIPATING ADULT LITERACY PROVIDER ORGANIZATIONS

APPENDIX II

PARTICIPATING ADULT LITERACY PROVIDER ORGANIZATIONS

Hacienda La Puente Unified School District
Correctional Education Division
Los Angeles, CA

Metropolitan Education Program
San Jose, CA

Ventura Adult/Continuing Education
Ventura, CA

Watsonville/Aptos Adult School
Watsonville, CA

Eastern Idaho Technical College
Idaho Falls, ID

Adult Success Center
Idaho St. University
Pocatello, ID

Lane Community College ABSE
Eugene, OR

Tillamook Bay Community College
Tillamook, OR

Columbia Basin College
Learning Opportunity Center
Pasco, WA

Literacy Action Center
Seattle, WA

Garrett Heyns Education Center
Shelton, WA

Laramie County Community College
Laramie, WY

Estill County PACE Program
Ravenna Elementary School
Ravenna, KY

Longfellow Adult Learning Center
Owensboro, KY

UAW/Ford EMU Academy
Ypsilanty, MI

Rouge Academy
Ford Motor Co. -- Dearborn Engine Plant
Dearborn, MI

Technology for Literacy Center
St. Paul, MN

STAR Adult Education Center
(Formerly: LVA of Biloxi)
Biloxi, MS

Greater Columbus Learning Center
Columbus, MS

Mississippi Gulf Coast Community College
Perkinston, MS

Odessa Community College
Adult Education Co-op
Odessa, TX

South Dade Skills Center
Leisure City, FL

Lexington Technology Center
Lexington, SC

El Centro del Cardenal
Boston, MA

Chinese American Civic Assocation
Boston, MA

United South End Settlement
Boston, MA

Community Learning Center
Cambridge, MA

Bronx Educational Services
Bronx, NY

York College Learning Center
Literacy Initiative
Jamaica, NY

Young Adult Learning Academy
New York, NY

Northwest Tri-County Intermediate Unit Center
Erie, PA

Lutheran Settlement House
Women's Project
Philadelphia, PA

Eva Bowlby Library
Workplace and Adult Literacy Projects
Waynesburg, PA

APPENDIX III

PROVIDER ORGANIZATION SCREENING FORM

APPENDIX III

PROVIDER ORGANIZATION SCREENING FORM

Introduction

Hello. My name is _____. I am calling to ask you to participate in a nationwide study of the use of technology in Adult Education. This study is being conducted as part of a research effort by the U.S. Congress's Office of Technology Assessment. We were recommended to you by _____. Can you take a few moments to answer some questions about your program?

___ Yes ___ No

*[Interviewer: If **Yes**, go to Section 1 below.]*

*[Interviewer: If **No**:]*
Is there a more convenient time, when I might call you back?

___ Yes; Date _____ Time: _____

___ Not Interested in Participating

*[Interviewer: If **Not Interested in Participating** above:]*

Thank you anyway.

Section 1. Demographics

Educational Institution and/or Site _____

Person Interviewed _____

Title/Position _____

Decisionmaker Type (circle one or more): Administrator Teacher Other: _____

Institution's Address _____

_____

Phone _____ Fax _____

Section 2. Experience with Technology

2-1. For how many years has your institution used computer-based technology for instructional purposes? *[Interviewer: Do not prompt! Mark an X for only one choice below.]*

___ Less than 15 months
___ 15 months to 3 years
___ More than 3 years

2-2. I'm going to read a list of types of adult instructional programs. For each program type I name, tell me if your institution offers it. And for each program type you do offer, tell me whether your institution uses computer technology to provide instruction or educational experiences. *[Interviewer: Prompt each choice below! Mark an X for all choices that apply.]*

Do you offer?	Does the instruction incorporate technology?
___ ABE (Level 1)	Uses Technol: Yes ___ No ___
___ ABE (Level 2)	Uses Technol: Yes ___ No ___
___ ABE (Level 3 or pre-GED)	Uses Technol: Yes ___ No ___
___ ABE (Level unsure)	Uses Technol: Yes ___ No ___
___ GED	Uses Technol: Yes ___ No ___
___ ESL/LEP	Uses Technol: Yes ___ No ___

Do you offer?	Does the instruction incorporate technology?
___ A Workplace Preparation or Workplace Literacy Program	Uses Technol: Yes ___ No ___
___ Literacy Instruction for Inmates at Correctional Facilities	Uses Technol: Yes ___ No ___
___ A Literacy Program Targeted for Families (i.e., an Intergenerational Program)	Uses Technol: Yes ___ No ___
___ A Program for At-risk Students Re-entering after Dropping Out of School	Uses Technol: Yes ___ No ___
___ A Volunteer, Tutor-based Program	Uses Technol: Yes ___ No ___

2-3. How did your institution or site first get interested in using computers and related technology for instructional purposes? *[Interviewer: Do not prompt! Mark an X for each choice mentioned.]*

___ Read professional literature on instructional technology.
___ Received recommendation from colleague or consultant.
Explain:

___ New member of professional staff had prior experience with instructional technology.
Explain:

___ Other:

2-4. That's all the questions we have for you at this time. We may call you back to ask you to respond to a more extensive written questionnaire on instructional technology and software. We may also ask you to participate in a follow-up telephone interview. We estimate that the questionnaire will take approximately ___ to complete and that the follow-up interview might take an additional ___ minutes. Would you be willing to participate?

___ Yes
___ No

*[Interviewer: If **Yes**:]*
Thank you. Can you suggest some times over the next few days when we reach you by phone?

Date _____ Time _____

Date _____ Time _____

Date _____ Time _____

Thank you again for taking the time to answer our questions.

APPENDIX IV

PROVIDER ORGANIZATION SURVEY FORM

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APPENDIX IV

PROVIDER ORGANIZATION SURVEY FORM

Thank you for participating in our survey of technology use in Adult Education. As you review the questions, you may find that some can be best answered by administrative personnel and some by instructional personnel. Please involve all staff necessary to provide accurate responses.

A. Demographics

Educational Institution and/or Site _____

Institution's Address:

City _____ State _____ Zip _____

Staff Members Completing the Survey — Position Type:

_____ Administrator Teacher

_____ Administrator Teacher

_____ Administrator Teacher

_____ Administrator Teacher

Size of Instructional Staff _____

Annual Budget for Instructional Technology _____

B. Computer Hardware

B1. How many computers or computer workstations are used for instructional purposes? _____

B2. Which types of computers are used for instructional purposes? (Circle more than one if necessary.)

Apple II IBM Other MS-DOS

Macintosh Other: _____

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B3. How much RAM is in each computer?

Apple II: _____
IBM: _____
Other MS-DOS: _____
Macintosh: _____
Other: _____

B4. What peripherals do you use with instructional computers? (Check all that apply.)

___ Color Monitor
___ 5.25" Disk Drive
___ 3.5" Disk Drive
___ 2 Disk Drives per Computer
___ Hard Drive
___ Mouse
___ Modem
___ Videodisc player
___ CD-ROM
___ Speech board/box
___ Touch screen
___ Scanner
___ Other:

B5. What peripherals that your site doesn't already use with instructional computers are you planning to purchase within the next year?

___ Color Monitor
___ 2nd Disk Drive for Single Drive Computers
___ Hard Drive
___ Mouse
___ Modem
___ Videodisc player
___ CD-ROM
___ Speech board/box
___ Touch screen
___ Scanner
___ Other:

B6. Does your institution (or program) also use computers for administrative purposes?

___ Yes
___ No

If you answered **No** above, skip to Section C below.

B7. If you answered **Yes** to Question B6 above, which came first, administrative use of technology or instructional use? Or did you start using computers for both purposes at about the same time?

___ Administrative Use First
___ Instructional Use First
___ At About the Same Time

B8. Aside from computer-related technology, what other kinds of technology do you use for instructional purposes? (Check all that apply.) For each kind of technology you use, briefly describe how you use it.

Technology	How You Use It
___ Television	
___ VCR	
___ Audiocassette player	
___ Other:	

B9. What non-computer-related technology that your site doesn't already use with for instructional purposes are you planning to purchase within the next year?

___ Television
___ VCR
___ Color Monitor
___ Audiocassette player
___ Other:

C. Purchase Decisionmakers

C1. Who is involved in making educational software purchase decisions? (Check all choices below that apply.)

___ Administrators
___ Teachers
___ Students
___ Others:

✓ If you checked only one item on the list above, skip to Section D below.

C2. If you checked more than one item on the list for Question C1 above, please explain the roles of the different people in software purchase decisionmaking. (Use the back of the page if necessary.)

C3. Who makes the final software purchase decision?

___ Administrators on their own.
___ Teachers on their own.
___ Administrators and teachers together.
___ Other:

D. Software Information Sources Consulted

D1. There is a wide variety of sources information on software available. Please indicate how often you consult each of the following sources when deciding what software to purchase for your institution or site. Use a number scale from **1** to **5**, where **1**=*never consult* and **5**=*always consult.*

Software catalogues
1 2 3 4 5

Advertisements
1 2 3 4 5

Word-of-mouth from colleagues and computer specialists
1 2 3 4 5

If you gave a rating of 4 or 5 to **Word-of-mouth** above, indicate the expertise of the people you rely on.

_____

_____

New software listings from popular computing magazines
1 2 3 4 5

Reviews from popular computing magazines
1 2 3 4 5

New software listings from professional publications
1 2 3 4 5

Reviews and/or Preferred Lists from professional publications
1 2 3 4 5

If you assigned a rating of 4 or 5 above, please write the name(s) of the publication(s) and its (their) sponsoring organization(s), and indicate whether they publish a preferred list or software reviews, or both.

Publication: _____

Sponsoring organization: _____

___ Reviews ___ Preferred List

Publication: _____

Sponsoring organization: _____

___ Reviews ___ Preferred List

Reviews and/or Preferred Lists from local/state/regional education agencies

1 2 3 4 5

If you assigned a rating of 4 or 5 above, please write the name(s) of the educational agency(ies), and indicate whether they distribute a preferred list or software reviews, or both.

Agency: _____

___ Reviews ___ Preferred List

Agency: _____

___ Reviews ___ Preferred List

Reviews and/or Preferred Lists from college- or university-based projects

1 2 3 4 5

If you assigned a rating of 4 or 5 above, please write the name(s) of the college(s) or university(ies), the name(s) of the project(s), and indicate whether they distribute a preferred list or software reviews, or both.

Institution: _____

Project: _____

___ Reviews ___ Preferred List

Institution: _____

Project: _____

___ Reviews ___ Preferred List

Reviews and/or Preferred Lists from online, computer-based services

1 2 3 4 5

If you assigned a rating of 4 or 5 above, please write the name(s) of the service(s), the name(s) of the service provider(s), and indicate whether they distribute a preferred list or software reviews, or both.

Online Service: _____

Provider: _____

___ Reviews ___ Preferred List

Online Service: _____

Provider: _____

___ Reviews ___ Preferred List

Apple Access Guides (Apple Computer, Inc.)
1 2 3 4 5

Guide to Literacy Software (Adult Literacy and Technology Project)
1 2 3 4 5

Oregon/Washington Adult Basic Skills Technology Consortium Software Buyers Guide
1 2 3 4 5

Intellimation Library for the Macintosh (Intellimation, Inc.)
1 2 3 4 5

The Educational Software Selector (EPIE Institute)
1 2 3 4 5

D2. Are there any other published information sources you frequently consult?

Title	Publisher

E. Information Desired from Software Information Sources

E1. Below is a series of statements about software evaluations. Each statement focuses on one aspect of software evaluation. Please rate each statement on a five-point scale, where **1** means that you **don't agree at all** and **5** means that you **strongly agree** -- so much so that you actively seek this type of information.

The evaluative comments should reflect field testing of the program with students.

1 *2* *3* *4* *5*

The evaluation should describe the program's good and bad points, and assess the seriousness of any problems.

1 *2* *3* *4* *5*

The evaluation should discuss the instructional implications of the program's good and bad points.

1 *2* *3* *4* *5*

The evaluation should offer tips to the teacher that will save time when actually using the program.

1 *2* *3* *4* *5*

The evaluation should compare the software program under review with other, similar programs.

1 *2* *3* *4* *5*

E2. Are there any other aspects of software evaluation about which you actively seek information?

F. Software Recommended for Instructional Purposes

Of the software products your institution uses as part of the instructional programs you offer, which products would you recommend to other institutions. For each product you list, indicate the kinds of adult student populations (e.g., ABE 1, ABE 2, ESL, GED) in which you have used the software and recommend it. And if any of the software products are shareware or public domain, please let us know this. (If you need more room to record the software products, use the back of this page.)

When you have completed your list, circle the five best software products overall.

Title	Publisher	Computer	Publ. Year	Adult Student Population

G. Additional Adult Literacy Software

Besides the software programs your institution has used, can you name any other recently released software programs that you have read or heard about as being especially well-suited for adult learners? If you can't remember the product's title, please describe it and name the publisher, if you know it.

Title	Publisher

H. Subject Areas for Technology

H1. Below is a list of subject areas that one or more of your instructional programs may cover. For each subject area, please check all columns that apply.

Subject Area	Using Stand-alone Software (Non-ILS)	Using an ILS*	Using Online Service	Currently Searching for Software	Cannot Find Appropriate Software	No Interest in Using Computers
Math: Basic Skills						
Math: Applications						
Math: Advanced Topics (Algebra, Geometry, etc.)						
Basic Reading Skills						
Reading Comprehension						
Grammar and Punctuation						
Spelling and Vocabulary						
Writing						
Computer Basic Skills and Keyboarding						
Parenting Skills						
Pre-employment and Work Maturity Skills						
Career Guidance						
Vocation-specific Skills						
Life Skills						
Health						
Social Science						
Science						
General Problem Solving						
GED Specific						
ESL Specific						
General Purpose: _____						
Other: _____						

H2. For any subject area above where you checked the column, **Cannot Find Appropriate Software**, please list specific curriculum topics for which you have searched for software but have been unsuccessful. (Please use the back of this page.)

* ILS stands for Integrated Learning System. An ILS typically covers one or more subject areas, includes a management system, and often runs on a network.

I. Types of Software

Below is a list of different types of software your institution or site may have purchased in the past or may be considering for purchase in the near future. Please check the appropriate column for each type.

Software Type	Have Purchased in the Past	Interested in Purchasing	No Interest in Purchasing Service
Drill and Practice			
Tutorial			
Simulation			
Wordprocessor			
Database			
Spreadsheet			
Telecommunications			
Desktop publishing/printing			
Authoring tool			
Other productivity tool			
Educational game			
Problem Solving			
Programs using human or near-human speech			
Multimedia			

J. Comprehensiveness of Software Products

J1. In your search for educational software, do you mostly seek out individual, stand-alone programs that address one particular instructional purpose or do you mostly seek out comprehensive series of products that address an entire curriculum area?

___ Stand-alone programs; one particular instructional purpose
___ Comprehensive series of products; an entire curriculum area
___ Seek out both, depending on the situation

J2. Please explain your answer to Question J1.

K. Learning Systems

K1. Does your institution or site own or lease an Integrated Learning System (ILS), or is your institution planning to purchase or lease an ILS within the next year?

___ Currently own or lease

Brand _____

___ Plan to own or lease

Brand _____

___ Considering whether to own or lease an ILS

___ Considered an ILS, but decided against it

Explain _____

_____

___ No, never considered an ILS.

If you answered *Considering whether to own or lease an ILS*, **Considered an ILS, but decided against it**, or **No, never considered an ILS** above, skip to Question K4 below.

K2. If you currently own or lease an ILS, what have been the positive aspects of incorporating it into the curriculum?

K3. If you currently own or lease an ILS, what have been the negative aspects of incorporating it into the curriculum?

K4. Does your institution use the Comprehensive Competencies Program (CCP), or is your institution planning to use CCP within the next year?

___ Currently use

___ Plan to use

___ Considering whether to use CCP

___ Considered CCP, but decided against it

Explain _____

_____

___ No, never considered CCP.

If you answered *Considering whether to use CCP*, **Considered CCP, but decided against it**, or **No, never considered CCP** above, skip to Question K7 below.

K5. If you are currently using CCP, what have been the positive aspects of incorporating it into the curriculum?

K6. If you are currently using CCP, what have been the negative aspects of incorporating it into the curriculum?

K7. Does your institution use IBM's PALS program or does it plan to use PALS within the next year?

___ Currently use

___ Plan to use

___ Considering whether to use PALS

___ Considered PALS, but decided against it

Explain _____

_____

___ No, never considered PALS.

If you answered *Considering whether to use PALS*, **Considered PALS, but decided against it**, or **No, never considered PALS** above, skip to Section L below.

K8. If you currently use PALS, what have been the positive aspects of incorporating the it into the curriculum?

K9. If you currently use PALS, what have been the negative aspects of incorporating the it into the curriculum?

L. Telecommunications and Online Services

L1. Does your institution make use of telecommunications software or any online services to provide instructional experiences, or does it plan to do so within in the next year?

___ Currently use

___ Online Service: _____
___ Telecommunications without an online service

___ Plan to use

___ Online Service: _____
___ Telecommunications without an online service

___ Considering whether to use telecommunications or an online service.

___ Considered using telecommunications or an online service, but decided against it

Explain _____

_____

___ No, never considered using telecommunications or an online service.

If you answered **Considering whether to use telecommunications or an online service**, **Considered using telecommunications or an online service, but decided against it**, or **No, never considered using telecommunications or an online service** above, skip to Section M below.

L2. If you currently use telecommunications software or an online service for instructional purposes, what have been the positive aspects of incorporating it into the curriculum?

L3. If you currently use telecommunications software an online service for instructional purposes, what have been the negative aspects of incorporating it into the curriculum?

M. Needs for Software and Technology

M1. In general, what have been the positive aspects of incorporating computer-based technology and software into the curriculum?

M2. In general, what have been the negative aspects of incorporating computer-based technology and software into the curriculum?

M3. Imagine that your institution had unlimited funds to purchase computers, related technology, and software, and could have educational software custom-developed to meet its instructional needs. Explain what the custom-developed software would accomplish and describe it briefly.

M4. Can you identify any problem areas of the curriculum that you feel could be better addressed by new instructional approaches or methods? Please be as specific as possible.

M5. Imagine that federal, state, or local government officials were considering funding for instructional uses of computers and related technology in adult literacy programs. What would be the best uses of limited government funds in this area? (Check only the two best uses of government funding.)

___ Support research on effective uses of instructional technology
___ Fund dissemination of research on effective uses of instructional technology
___ Fund dissemination of software evaluations
___ Fund professional sharing of promising instructional practices that incorporate instructional technology
___ Fund purchase of software
___ Fund development of adult literacy-specific software
___ Fund purchase of computers and peripherals
___ Other:

Please explain your response above.

APPENDIX V

PROVIDER ORGANIZATION FOLLOW-UP INTERVIEW

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APPENDIX V

PROVIDER ORGANIZATION FOLLOW-UP INTERVIEW

Follow-up Questions to Screening Form

Section 2

[INTERVIEWER: ___ ASK QUESTION ___ SKIP TO SECTION C ON PAGE 3]

You have previously indicated that your institution (or site) offers instruction programs that do not take advantage of computer technology. You identified the following programs. [INTERVIEWER: READ ALOUD THE CIRCLED PROGRAM TYPES FROM THE LIST BELOW.]

ABE (Level 1)	A Workplace Preparation or Workplace Literacy Program
ABE (Level 2)	Literacy Instruction for Inmates at Correctional Facilities
ABE (Level 3 or pre-GED)	A Literacy Program Targeted for Families (i.e., an Intergenerational Program)
ABE (Level unsure)	A Program for At-risk Students Re-entering after Dropping Out of School
GED	A Volunteer, Tutor-based Program
ESL/LEP	

What are your reasons for not using technology in these programs? [INTERVIEWER: PROBE FOR GENERAL REASONS, AS WELL AS REASONS RELATED TO SPECIFIC PROGRAM TYPES. RECORD RESPONSES ON THE NEXT PAGE.]

General Reasons:

Program Type:

Reason:

Program Type:

Reason:

Program Type:

Reason:

Program Type:

Reason:

Program Type:

Reason:

Program Type:

Reason:

Follow-up Questions to Survey

C. Purchase Decisionmakers

C2. [INTERVIEWER: ___ ASK QUESTIONS ___ SKIP QUESTIONS]

What roles do program administrators play in making educational software purchase decisions?

What roles do teachers play in making educational software purchase decisions?

[INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What roles do students play in making educational software purchase decisions?

[INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What roles do _____ play in making educational software purchase decisions?

Software Acquisition Procedure
(Follow-up to C. Purchase Decisionmakers)

Briefly describe the steps in your institution's educational software acquisition procedure. [INTERVIEWER: DO NOT PROMPT WITH THE CHOICES BELOW! MARK EACH STEP MENTIONED WITH THE **NUMBER** INDICATING ITS POSITION IN THE SEQUENCE OF STEPS.]

___ Consult **print and/or online sources** of information on educational software
___ Consult with **colleagues and/or educational technology experts** (word of mouth)
___ Consult with **software publishers' representatives**
___ Attend **technology conference sessions**
___ Attend **computer and/or software shows**
___ **Administrators preview software**
___ **Teachers preview software**
___ Test software with students
___ Purchase software
___ Other:

[INTERVIEWER: PROBE FOR ANY FURTHER EXPLANATION OF THE ACQUISITION PROCEDURE YOU FEEL IS NECESSARY.]

D. Software Information Sources Consulted

Now let's discuss the various information sources on educational software that are available. In your completed survey form, you indicated that you frequently or always consult the following sources:

[INTERVIEWER: READ ALOUD THE CIRCLED SOURCES:]

Software catalogues

Word-of-mouth

magazines

Reviews from popular computing magazines

Reviews and/or Preferred Lists from professional publications education agencies

Reviews and/or Preferred Lists from college- or university-based projects

Apple Access Guides (Adult

Oregon/Washington Adult Basic Skills Technology Consortium Software Buyers Guide

The Educational Software Selector (EPIE Institute)

Advertisements

New software listings from popular computing

New software listings from professional publications

Reviews and/or Preferred Lists from local/state/regional

Reviews and/or Preferred Lists from online, computer-based services

Guide to Literacy Software

Literacy and Technology Project)

Intellimation Library for the Macintosh

Can you explain why you frequently or always consult these sources? [INTERVIEWER: DO NOT PROMPT WITH THE LIST BELOW! PROBE FOR GENERAL REASONS AND REASONS THAT ARE SOURCE-SPECIFIC. FOR REASONS THAT ARE SOURCE SPECIFIC, INDICATE THE SOURCE(S) TO THE RIGHT OF THE REASON.]

___ Info is reliable

___ Provides sufficient detail

___ Provides evaluative info

___ Source is readily available

___ Source is affordable

___ Doesn't take up too much of my time

___ Other:

Now let's discuss the information sources that you indicated that you rarely or never consult. These included the following:

[INTERVIEWER: READ ALOUD THE CIRCLED SOURCES:]

Software catalogues

Word-of-mouth

magazines

Reviews from
popular computing magazines

Reviews and/or Preferred Lists
from professional publications
education

Reviews and/or Preferred Lists
from college- or university-
based projects

Apple Access Guides
(Adult

Oregon/Washington Adult Basic
Skills Technology Consortium
Software Buyers Guide

The Educational Software Selector
(EPIE Institute)

Advertisements

New software listings
from popular computing

New software listings
from professional publications

Reviews and/or Preferred Lists
from local/state/regional

agencies

Reviews and/or Preferred Lists
from online, computer-based
services

Guide to Literacy Software

Literacy and Technology Project)

Intellimation Library
for the Macintosh

Can you explain why you rarely or never consult these sources? [INTERVIEWER: DO NOT PROMPT WITH THE LIST BELOW! PROBE FOR GENERAL REASONS AND REASONS THAT ARE SOURCE-SPECIFIC. FOR REASONS THAT ARE SOURCE SPECIFIC, INDICATE THE SOURCE(S) TO THE RIGHT OF THE REASON.]

___ No knowledge of source

___ Info is unreliable

___ Provides insufficient detail

___ Lacks evaluative info

___ Not readily available

___ Too expensive

___ Takes up too much of my time

___ Other:

E. Information Desired from Software Information Sources

Imagine that there existed a published source of information on educational software that perfectly suited your institution's needs. What kinds of information would it include? [INTERVIEWER: DO NOT PROMPT THE CHOICES BELOW!]

___ Components included in package
___ Computer family
___ Computer hardware configuration (e.g., RAM requirements, number of disk drives, peripherals required or recommended)
___ Cost
___ Type of software (e.g., drill and practice, simulation)
___ Student population appropriateness
[INTERVIEWER: IF **STUDENT POPULATION APPROPRIATENESS** IS MENTIONED, PROBE FOR DETAILS ABOUT THE INFORMATION RESPONDENT DESIRES.]

___ Subject area
___ Specific content topics
___ Software product's learning goals
___ Correlation to standard curriculum or standardized test
___ Description of the program
___ Sample printouts and/or accurate screen illustrations from the product
___ *Recommendation of the program based on an evaluation process
___ *Evaluative judgments about the program (beyond the fact that was or was not recommended)
___ Results of testing the program with students
___ Results of research or normative testing as to the program's effectiveness
___ Other:

*[INTERVIEWER: ASK THE FOLLOWING QUESTIONS ONLY IF THE RESPONDENT MENTIONED ***RECOMMENDATION OF THE PROGRAM BASED ON AN EVALUATION PROCESS** OR ***EVALUATIVE JUDGMENTS ABOUT THE PROGRAM** ABOVE:]

You indicated that you would like access to evaluative information about software programs. What qualifications should the evaluators have? [INTERVIEWER: DO NOT PROMPT THE CHOICES BELOW!]

___ Teaching experience with the student population considered in the evaluation
___ Experience using technology with adult students
___ Other:

H. Subject Areas for Technology

H1 and H2. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

In your completed survey, you indicated that you are either currently searching for or cannot find appropriate software for the following subject areas. [INTERVIEWER: READ ALOUD THE CIRCLED ITEMS BELOW.]

Math: Basic Skills

Math: Applications

Math: Advanced Topics (Algebra, Geometry, etc.)

Basic Reading Skills

Reading Comprehension

Grammar and Punctuation

Spelling and Vocabulary

Writing

Computer Basic Skills and Keyboarding

Parenting Skills

Pre-employment and Work Maturity Skills

Career Guidance

Vocation-specific Skills

Life Skills

Health

Social Science

Science

General Problem Solving

GED Specific

ESL Specific

General Purpose:

Other:

Can you be more specific. For which content topics have you been searching for software?

For which content topics have you been searching unsuccessfully for software?

I. Types of Software

[INTERVIEWER: FOR EACH OF SOFTWARE TYPES CIRCLED BELOW, PROBE AS FOLLOWS:]

How are you using _____ software as an instructional tool?

Wordprocessor

Database

Spreadsheet

Telecommunications

Desktop publishing/printing

Authoring tool

Other productivity tool _____

Multimedia

J. Comprehensiveness of Software Products

J1 and J2. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

In your completed survey, you indicated that you seek out both stand-alone software programs and comprehensive series of products, depending on the situation. What factors help determine whether you will seek stand-alone software programs or a comprehensive series of products.

K. Learning Systems

K1. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What are your primary reasons for acquiring the ILS? [INTERVIEWER: DO NOT PROMPT. MARK AN **X** FOR ALL RESPONSES.]

___ Basic Skills Practice
___ Adult Literacy-Specific Instruction
___ Higher Order Thinking Skills
___ Computer-based Management
___ Diagnostic Testing and Automatic Lesson Prescription
___ Other:

K2. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What have been the positive aspects of incorporating the ILS into the curriculum?

K3. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What have been the negative aspects of incorporating the ILS into the curriculum?

K4. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What are your primary reasons for acquiring Comprehensive Competencies Program (CCP)? [INTERVIEWER: DO NOT PROMPT. MARK AN **X** FOR ALL RESPONSES.]

___ Basic Skills Practice
___ Adult Literacy-Specific Instruction
___ Higher Order Thinking Skills
___ Computer-based Management
___ Diagnostic Testing and Automatic Lesson Prescription
___ Other:

K5. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What have been the positive aspects of incorporating CCP into the curriculum?

K6. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What have been the negative aspects of incorporating CCP into the curriculum?

K8. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What have been the positive aspects of incorporating IBM's PALS program into the curriculum?

K9. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What have been the negative aspects of incorporating PALS into the curriculum?

L. Telecommunications and Online Services

L1. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What are your primary reasons for using telecommunications software or an online service? [INTERVIEWER: DO NOT PROMPT. MARK AN **X** FOR ALL RESPONSES.]

___ Provide Experience with Telecommunications
___ Motivate Written Communication Among Students
___ Provide Adult Literacy-Specific Instruction
___ Develop Higher Order Thinking Skills
___ Enhance Student Self-Esteem
___ Other:

L2. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What have been the positive aspects of incorporating telecommunications software or online services into the curriculum?

L3. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

What have been the negative aspects of incorporating telecommunications software or online services into the curriculum?

M. Needs for Software and Technology

M1. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

In general, what have been the positive aspects of incorporating computer-based technology and software into the curriculum?

M2. [INTERVIEWER: ___ ASK QUESTION ___ SKIP QUESTION]

In general, what have been the negative aspects of incorporating computer-based technology and software into the curriculum?

M3. [INTERVIEWER:

___ REVIEW THE RESPONSE TO QUESTION M3 OF THE SURVEY, AND PROBE FOR MORE DETAIL.
___ SKIP THIS QUESTION.

M4. [INTERVIEWER:

___ REVIEW THE RESPONSE TO QUESTION M4 OF THE SURVEY, AND PROBE FOR MORE DETAIL.
___ SKIP THIS QUESTION.

M5. [INTERVIEWER:

___ REVIEW THE RESPONSE TO QUESTION M5 OF THE SURVEY, AND PROBE FOR A MORE DETAILED EXPLANATION.
___ SKIP THIS QUESTION.

Software Characteristics Considered Important

I would like to ask you some questions about the characteristics of software that you consider most important when deciding which software to purchase -- the characteristics that truly determine whether your institution will purchase a software product?

[INTERVIEWER: READ EACH QUESTION BELOW, BUT **NOT** PROMPT WITH THE LIST OF CHARACTERISTICS. IF YOU THINK THAT THE RESPONDENT IS DISCUSSING TOO MANY CHARACTERISTICS, REMIND HIM/HER TO ONLY MENTION THE ONES THAT ULTIMATELY DETERMINE THE PURCHASE DECISION.]

Let's start with software content. What characteristics regarding software content help determine the software products you will purchase? Also, let me know if a characteristic relates to a specific student population (e.g., ABE or GED).

[INTERVIEWER: DO NOT PROMPT! IF A CHARACTERISTIC RELATES TO A SPECIFIC STUDENT POPULATION, MARK THE ABBREVIATION FOR THAT POPULATION IN THE BLANK; OTHERWISE, MARK AN **X**.]

___ Content is **appropriate for intended student population.**
___ Content is **accurate.**
___ Content is **free of any bias or stereotyping.**
___ Content **supports our institution's curriculum.**
___ Content **addresses learners' career goals.**
___ Content **relates to learners' life experiences.**
___ Other:

Now let's focus on instructional quality or methodology. What characteristics regarding instructional quality or instructional methodology help determine the software products you will purchase? Also, let me know if a characteristic relates to a specific student population (e.g., ABE or GED).
[INTERVIEWER: DO NOT PROMPT! IF A CHARACTERISTIC RELATES TO A SPECIFIC STUDENT POPULATION, MARK THE ABBREVIATION FOR THAT POPULATION IN THE BLANK; OTHERWISE, MARK AN X. IF NECESSARY, EXPLAIN THAT THE MEANING OF THE TERM INSTRUCTIONAL QUALITY OR INSTRUCTIONAL METHODOLOGY SHOULD INCLUDE THE PROGRAM'S TEACHING STRATEGY AND THE EXTENT TO WHICH IT TAKES ADVANTAGE OF COMPUTER TECHNOLOGY'S CAPABILITIES.]

___ Program is **useful in the instructional settings** our institution or program provides.
___ Application **takes advantage of the computer's** and related technology's **capabilities**).
___ The instructional approach is **appropriate for the intended student population.**
___ Student is an **active participant in the learning** process.
___ The learning process is **student-directed**.
___ Student understands the on-screen presentation, and **can proceed without confusion or frustration (easy to use)**.
___ Program can be used to **support cooperative learning**.
___ Program challenges and stimulates **creativity**.
___ **Graphics and color enhance** the instructional process.
___ **Human or near-human voice enhance** the instructional process.
___ Learner can **alter program** sequence or pace.
___ **Help is available** at likely points of need.
___ **Feedback is appropriate** to the intended student population.
___ **Feedback is informative**.
___ Procedural and instructional **statements are clear**.
___ **Teacher can easily modify** the program (e.g., change or add content; change parameters).
___ Useful **student performance records** are stored for future retrieval.
___ Other:

Now let's discuss technical quality. What characteristics regarding technical quality help determine the software products you will purchase? Also, let me know if a characteristic relates to a specific student population (e.g., ABE or GED). [INTERVIEWER: DO NOT PROMPT! IF A CHARACTERISTIC RELATES TO A SPECIFIC STUDENT POPULATION, MARK THE ABBREVIATION FOR THAT POPULATION IN THE BLANK; OTHERWISE, MARK AN X.]

___ Program **runs consistently** under all normal conditions and is "**bug-free**."
___ Program is **easy to use**.
___ **Voice is clear** and can be easily interpreted.
___ **Graphics are clear** and can be easily interpreted.
___ **Print capability** is included, when appropriate.
___ Program **uses other technologies** (e.g., videodisc, CD-ROM) to enhance learning when appropriate.
___ Other:

Now let's focus on other issues that you always consider when you decide whether to purchase a software product for instructional purposes. [INTERVIEWER: PROMPT EACH ITEM BELOW. USE THE FORM: "IS _____ AN ESSENTIAL ISSUE?"]

___ Price
[INTERVIEWER: IF **PRICE** IS MENTIONED:]
Is there a maximum price you are willing to spend on a software product?

___ Yes: Price: $_____
___ No: Explain:

___ Hardware compatibility
[INTERVIEWER: IF **HARDWARE COMPATIBILITY** IS MENTIONED, PROBE FOR SPECIFICS.]

___ Computer model
___ Computer RAM requirements
___ Computer peripherals required
[INTERVIEWER: IF **COMPUTER PERIPHERALS REQUIRED** IS MENTIONED:]
Please explain.

___ Network version available

___ Preview copies available
___ Back-up copies provided
___ Existence and quality of user's manual
___ Supplementary student print materials
___ Free telephone technical support (800 number)
___ Adequate warranty
[INTERVIEWER: IF **ADEQUATE WARRANTY** IS MENTIONED:]
Is there a minimum warranty period your institution will accept?

___ Yes: Explain:

___ No

APPENDIX VI

HIGHLY RECOMMENDED STAND-ALONE SOFTWARE PRODUCTS FROM 33 ADULT LITERACY PROVIDER ORGANIZATIONS

APPENDIX VI

HIGHLY RECOMMENDED STAND-ALONE SOFTWARE PRODUCTS FROM 33 ADULT LITERACY PROVIDER ORGANIZATIONS

This appendix presents stand-alone software products that were highly recommended by at least one of the 33 adult literacy provider organizations surveyed for this report. Separate lists are presented for the 12 technology-novice organizations and the 21 technology-expert organizations.

HIGHLY RECOMMENDED STAND-ALONE SOFTWARE PRODUCTS FROM TECHNOLOGY-NOVICE ADULT LITERACY PROVIDER ORGANIZATIONS

The following list of stand-alone software products includes 29 titles but represents 55 products. Some titles are for series of products, but each product within a series can be purchased separately.

Publisher	Title
Broderbund	Print Shop and The New Print Shop
Datastorm Tech.	ProComm
Hartley	Adjectives
Hartley	Adverbs
Hartley	Analogies Tutorial
Hartley	Figurative Language
Hartley	Homonyms
Hartley	Nouns/Pronouns
Hartley	Project STAR: Levels 1, 2, 3
Hartley	Project STAR: Levels 4, 5, 6
Hartley	That's My Job! Levels 1 & 2
Hartley	Verb Usage Multi-Pak
IBM	IBM Private Tutor
Milliken	Escape from Algebra
Milliken	Great States Race
Milliken	Word Math I & II
Mindscape	Crossword Magic
Penn State University Institute for the Study of Adult Literacy	R.O.A.D. to Success
Penn State University Institute for the Study of Adult Literacy	Job Trails

Queue	Life Skills Reading Series
Queue	New GED Series
Simon and Schuster	Typing Tutor IV
Skills Bank	Skills Bank II: Language Series
Skills Bank	Skills Bank II: Mathematics Series
Skills Bank	Skills Bank II: Reading
Skills Bank	Skills Bank II: Study Skills
Skills Bank	Skills Bank II: Writing
Sunburst Communications	Type to Learn
WordPerfect	WordPerfect

HIGHLY RECOMMENDED STAND-ALONE SOFTWARE PRODUCTS FROM TECHNOLOGY-EXPERT ADULT LITERACY PROVIDER ORGANIZATIONS

The following list of stand-alone software products includes 42 titles but represents 69 products. Some titles are for series of products, but each product within a series can be purchased separately.

Publisher	Title
Aldus	Aldus PageMaker
American Language Academy	Spanish-to-English Learning Focus (SELF)
Borland	Dbase IV
Broderbund	Print Shop and The New Print Shop
Broderbund	Where in Europe is Carmen Sandiego
Broderbund	Where in the USA is Carmen Sandiego
Broderbund	Where in the World is Carmen Sandiego
Broderbund	Where in Time is Carmen Sandiego
Claris	AppleWorks & AppleWorks GS
Claris	MacPaint
Claris	MacWrite II
CUE SoftSwap	FrEdWriter
Davidson	Spell It Plus
Davidson	Word Attack Plus
Educational Testing Service	SIGI Plus
Great Wave	NumberMaze
Lotus Development	Lotus 1-2-3
Microsoft	Microsoft Word
Microsoft	Microsoft Works
Milliken	Cloze Plus
Milliken	Escape from Algebra
Milliken	Math Sequences Series
Mindscape	Crossword Magic
Queue	Gapper Reading Lab
Queue	Pre-GED Preparation
Resource Central	Super Pilot

Scholastic	Bank Street Writer/Bank Street Writer III
Scholastic	Math Shop
Simon and Schuster	Typing Tutor IV
Skills Bank	Skills Bank II: Language Series
Skills Bank	Skills Bank II: Mathematics Series
Skills Bank	Skills Bank II: Reading
Skills Bank	Skills Bank II: Study Skills
Skills Bank	Skills Bank II: Writing
Software Toolworks	Mavis Beacon Teaches Typing
Spinnaker	PFS First Choice
Steck-Vaughn	GED 2000
Sunburst Communications	Green Globs & Graphing Equations
Sunburst Communications	M-ss-ng L-nks Series
Sunburst Communications	Type to Learn
W.W. Norton	Norton Textra Writing v.6
WordPerfect	WordPerfect